FEBRUARY 29, 1960

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Reliability Concept Opens New Arena for Competition

Sherrod E. Skinner, executive vice president, General Motors Corp., keys the development to the customer's growing insistence on consistent performance. "We have become accustomed to thinking in terms of quality control. The new concept measures performance of the part or product."

Page 57

Sales Ride High; Metalworkers See 2nd Quarter as Key to Outlook

What to Do When Imports Hurt

Thermoelectricity Promises Impact On Your Methods, Products, Markets

Crush Wheel Dressing Cuts Costs In Grinding Complicated Fasteners

Program Your Hand Tool Replacement

Galvanizers Push for New Facilities

COMPLETE CONTENTS
TURN PAGE

METALWORKING WEEK
PAGE 37

How B&W JOB-MATCHED TUBING provides ease of fabrication and freedom of design

With low-cost B&W Welded Carbon Steel Mechanical Tubing you will have

... Ease of fabrication—provided through uniformity of properties and tolerances and complete quality control including ultrasonic inspection.

... Freedom of design—provided through range of sizes, types of finishes, grades of steel.

These are just a few of the reasons it pays to specify B&W Job-Matched Welded Carbon Steel Mechanical Tubing for your applications.

Call the tubing specialist at your local B&W District Sales Office, or write for Bulletin TB-419 for full information. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

This Week in STEEL

The Metalworking Weekly

February 29, 1960 Vol. 146 No. 9

Sales Stay High; So Does Optimism for 1960 Prospects

Metalworking sales continue high, even though they're slightly below yearend forecasts in many cases. Executives contacted in a STEEL survey report second quarter sales hold the key to 1960's over-all prospects. They look for an upturn in volume in the second period and see the year as a whole finishing 5 per cent ahead of 1959. PAGE 47

What to Do When Imports Hurt

You might try concentrating your marketing, coupling that with hard work and economy. Atlantic Steel Co., Atlanta, did just that after it lost 44 per cent of its output and 30 per cent of its employees when hit by a backyard flood of foreign steel. Result: It fought back to a record year in 1959. PAGE 53

Get Set for the Shock of Thermoelectricity

It'll open new markets, cause major shifts in existing ones. It'll demand new production processes, new standards of efficiency and reliability, new materials. It'll challenge the imagination of the designer. Elimination of moving parts offers great advantages: Freedom from maintenance, long life, noiseless and vibrationfree operation. Nearly every segment of metalworking may eventually be affected by the development of this vast new technology. Some applications exist today; countless more are on the way. PAGE 57

Crush Dressing Pays Grinding Dividends

Customers are paying 25 per cent less for some fasteners since production men at Standard Pressed Steel Co., Jenkintown, Pa., turned to centerless grinding with crushed wheel dressing to combine forming with finishing operations. More complex parts can be ground to closer tolerance and better finish. PAGE 92

Program Your Hand Tool Replacement

Planned hand tool replacement has stepped up tool efficiency by 30 to 40 per cent and paid for itself three times over at James B. Clow & Sons, Coshocton, Ohio. Clow, in a joint study with Ingersoll-Rand Co., found that a new tool cut grinding time on the bell end of a 6 in. cast iron pipe by 60 per cent. PAGE 94

Galvanizers Push for New Facilities

Demand for galvanized and aluminized products has touched off an expansion cycle. Look for six new continuous galvanizing and aluminizing lines to be added by the end of the year to the 35 now operating. Two more are being contemplated for 1961 and several more are in the talking stage. PAGE 111

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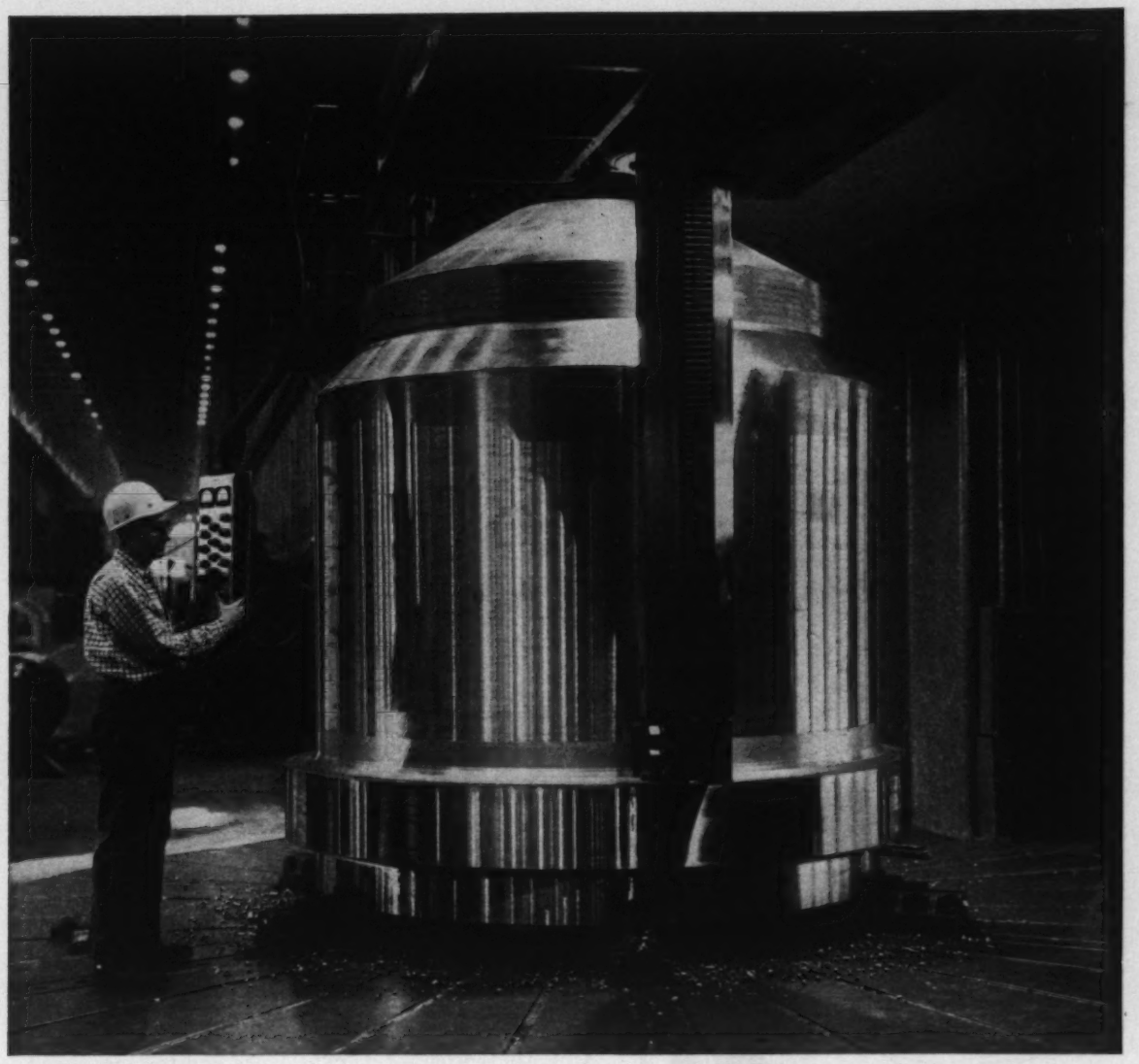

Flange diameter: 106 inches

No less impressive: body diameter is 96 inches, and bore diameter is 75 inches. This main cylinder stands 115¾ inches high, and weighs 103,300 pounds. Made of molybdenum-vanadium steel, we heat-treated and tested it before shipping to our customer. By now, it's been finish-machined and is hard at work in a hydraulic press.

Incidentally, the same order called for three other cylinders, one bolster, and four tie rods. These pieces ranged in weight from 22,000 pounds to 113,000 pounds. Bethlehem forged and machined them all as specified, and delivered them on time.

RIGHT ON THE NOSE. Our shops will meet your specifications *exactly* on all types of press, drop, and hammer forgings, regardless of size or design.

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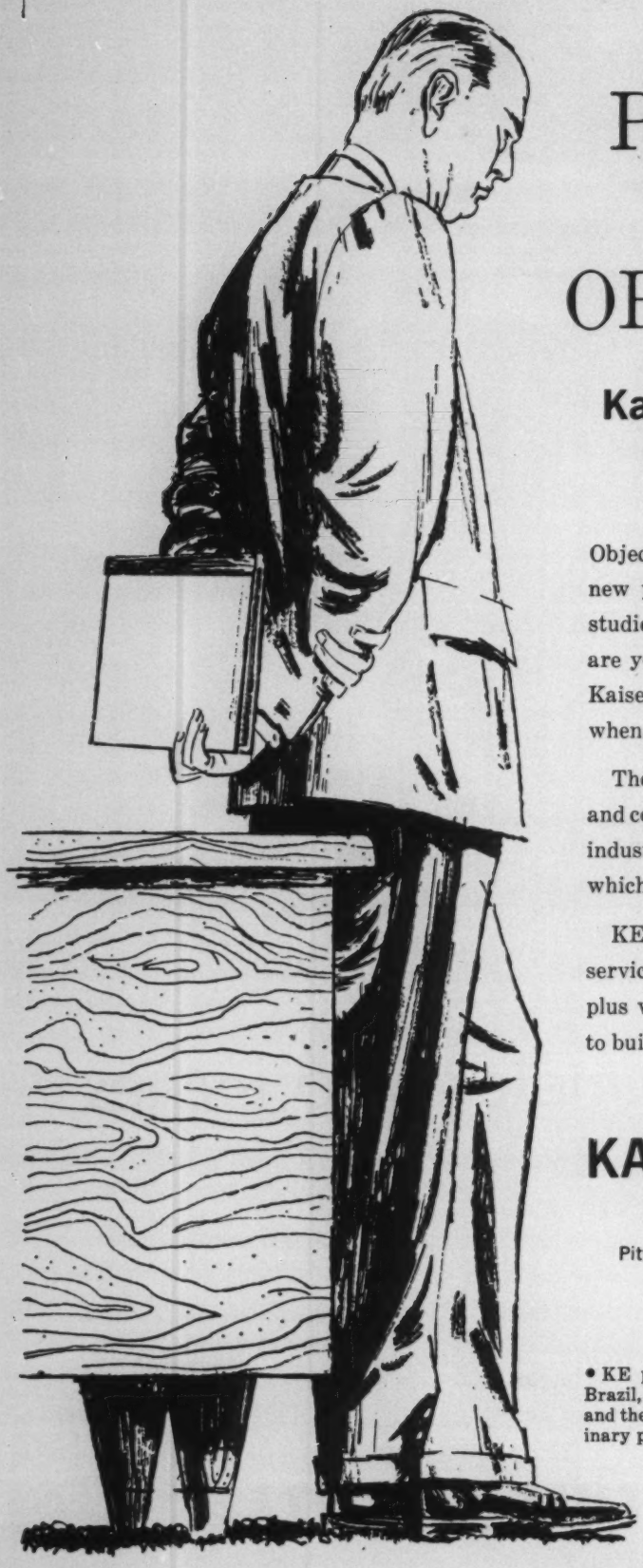

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Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

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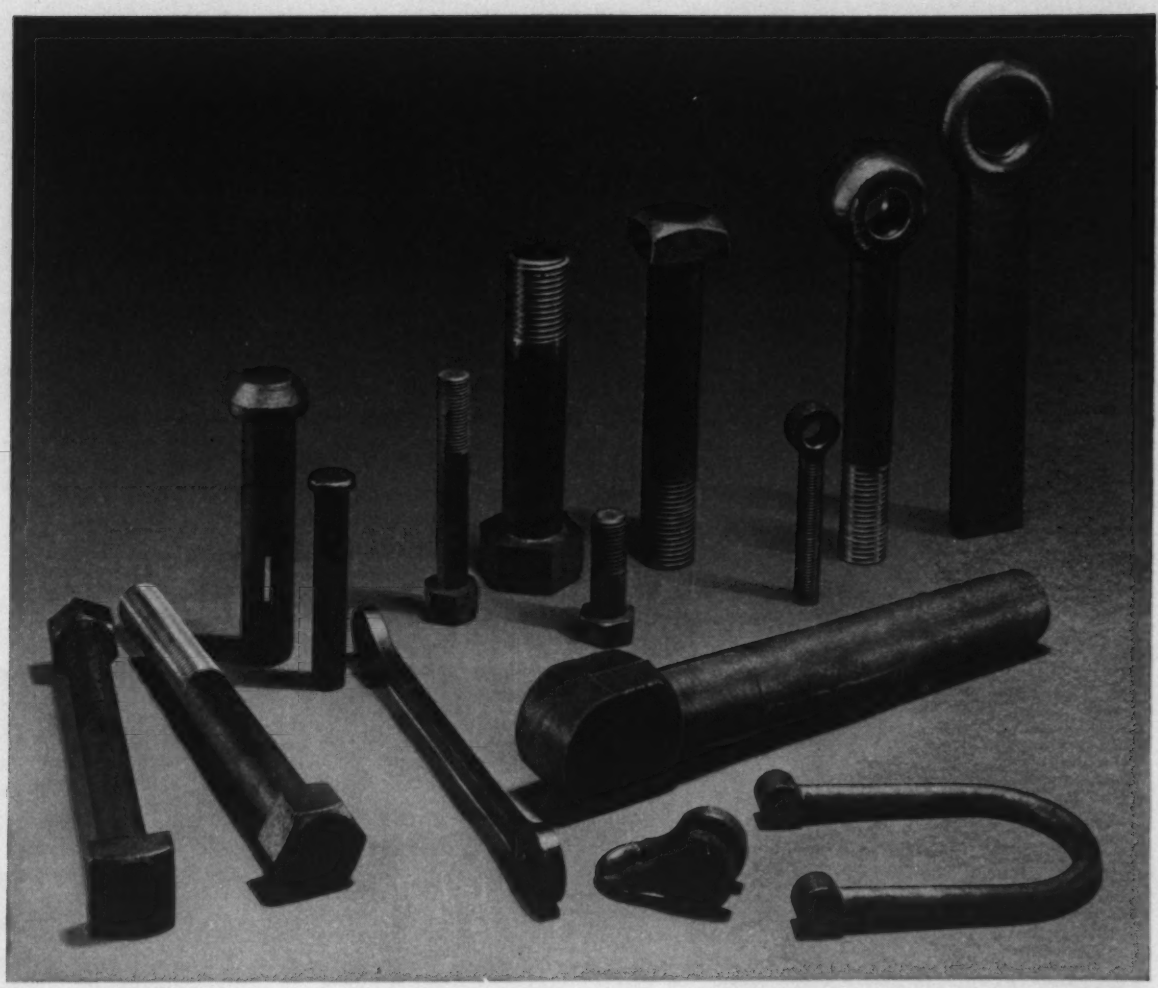

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9 trouble-free years— still no trouble in sight

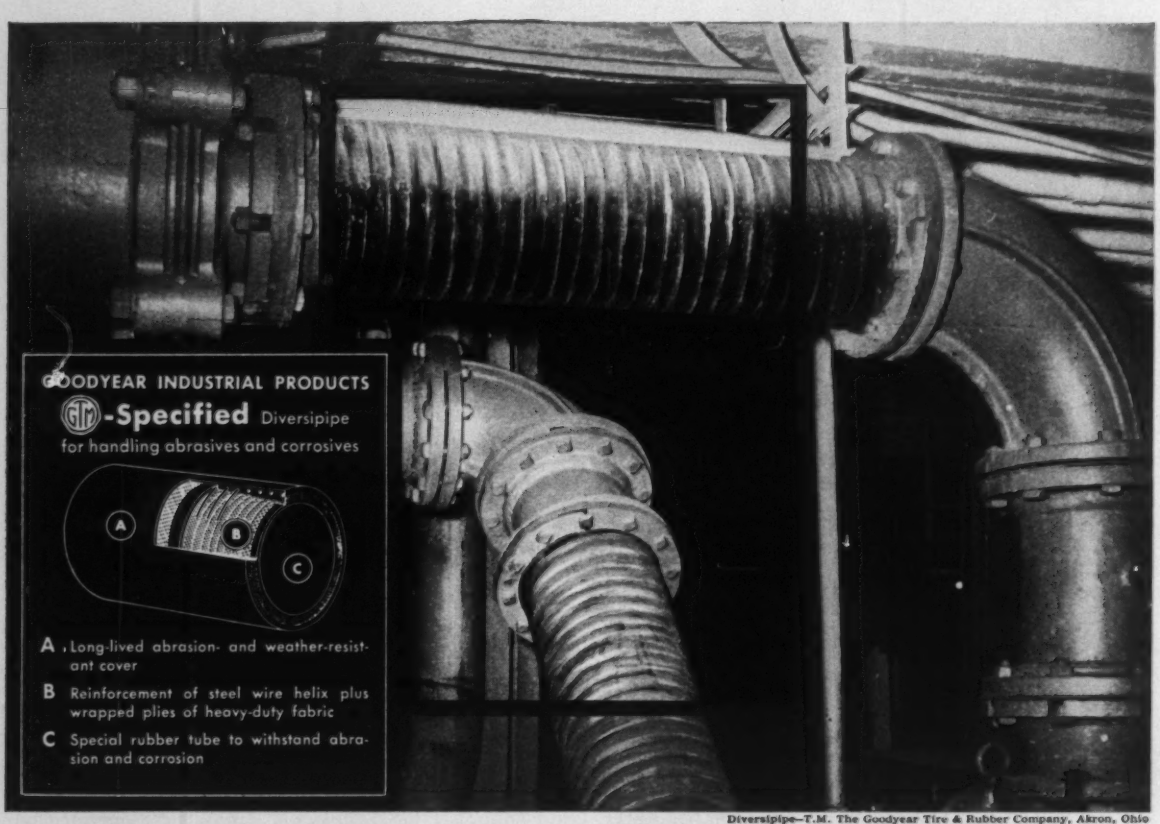
HANDLING the murderous abrasion of iron-ore slurry was only part of the problem when they added new facilities at this big Northeastern mine. There was also incessant vibration from pumps and refiners—certain to encourage leakage and shorten the life of just about any kind of slurry lines used.

But not if the lines were Diversipipe: recommended by the G.T.M.—Goodyear Technical Man. That super-tough rubber pipe fights off abrasion—absorbs shock. A bonus benefit: its flexibility makes intricate installations easier and less expensive.

At last report, the Diversipipe had been handling minus 14 mesh slurry—at 10 feet per second—for 9 straight, trouble-free years. And it's still giving like-new performance.

In fact, Diversipipe has proved the moneysaving answer to tough material-handling problems like this in many a plant. For expert tips on handling pumpable materials—especially abrasives or corrosives—check with the G.T.M. through your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*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B Reinforcement of steel wire helix plus wrapped plies of heavy-duty fabric
C Special rubber tube to withstand abrasion and corrosion

Diversipipe—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

DIVERSIPIPE BY

GOODYEAR

THE GREATEST NAME IN RUBBER

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

February 29, 1960

Aromas Anonymous

The scent of freshly roasted coffee pleases most people. But, like all good things, when taken in concentrated form for an extended period, even that delightful fragrance can become annoying.

Some 500 commercial coffee roasting plants in the U. S. had that "good neighbor" problem until a gas fired afterburner was developed for installation in flue outlets. Now, in many cases, the flames consume all odors. Which leads to . . .

Another Pollution Problem

On Jan. 18, Mirrors of Motordom dealt with the location of exhaust systems on U. S. automobiles. Our old buddy Shrdlu (down in the Linotype room) suggested we illustrate a squib about the column by showing a carefree driver wheeling along in a convertible—its exhaust spewing out of a pipe mounted smack above the front grille. We took Shrd's advice. Then this letter came in.

Milton W. Elmendorf, Penfield, N. Y., comments that after much personal experimentation (and a few untoward happenings) he believes all exhaust pipes should be vented above car roofs. "I realize that would startle auto designers, but where public health is endangered, something drastic is necessary," concludes Mr. Elmendorf.

Shrdlu now has visions of amassing personal wealth by designing exhaust systems.

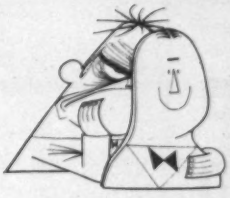
Seaway Shippers Cut Costs

Metalworking companies are lowering the boom on costs of shipping goods abroad. The answer: Moving cargoes via the St. Lawrence Seaway. Willys Motors Inc., a subsidiary of Kaiser Industries Corp., exports Jeeps through the Port of Toledo for $48.12 less per unit than it costs to ship through New York. Elimination of transshipping makes the big difference.

Landlocked firms also benefit. A Cincinnati company reports it can put down a bottle uncasing machine in Rotterdam, Holland, cheaper and faster via the "Eighth Sea" vs. using any Eastern or Southern ports. The U. S. armed services saved $638,483 last year by shipping foreign bound defense cargoes through the Seaway.

Next week, Assistant Editor Derry Eynon will give you a dockside view of "Outlook—1960" for the nation's fourth seacoast. If you are in foreign markets, watch for the article.

Smile If It Kills You



"What if the boss does turn down your carefully considered sales plan without a hearing? What if a subordinate's blunder does wreck that delicate, vital deal you've been negotiating for months? Maintain a calm, imperturbable exterior at all costs. What's happening to your insides is nobody's business but the surgeon's."

That wry advice is handed out in the American Management Association's book, *The Embattled Executive.*

That all too common affliction can be met in another manner. Next week, read Associate Managing Editor John Morgan's article, "Production Efficiency—How to Sell It to the Boss." It's bound to soothe any stomach churnings and ease the way for adoption of your plan. The article, fifth in our Program for Management series, is also a dandy source of ideas to submit in our Usership contest. Details are on Page 6.

Crossfire

At a cocktail party last weekend, we gave injudicious praise for the new dress our hostess was wearing, being especially fulsome because she had made it herself.

"All right, she can sew," our wife snapped later. "But to you she'd look good in a flour sack."

We attempted to make hasty amends: "Darling, you can cook."

We haven't heard the last of it yet.

At least the experience made us unusually sympathetic to the plight of the editors caught in a competitive snare, this time between steel and aluminum. We say "this time" because, alas, the competitive brambles are peculiarly prone to snag editors. They make a comment about Process X and proponents of Process Y take exception. They extoll the virtues of Component A, and makers of Component B challenge the claims for A.

Ready, Aim, Shoot

Our editors got deep into the briar patch with the article, "Aluminum Beats the Cold" (STEEL, Dec. 21, 1959, p. 86). Here are comments about it from Charles M. Parker, assistant vice president for the American Iron & Steel Institute:

"We feel this article is misleading and inaccurate with regard to the use of metal containers

for storing liquefied gases at subzero or cryogenic temperatures.

"For example, paragraph two states, in part: 'Within the temperature ranges required, steel shows a transition from ductile to brittle fracture.' This statement constitutes a blanket indictment of steel which is not only unfair but erroneous.

"Two types of steel are used most successfully in low temperature ranges. One, 9 per cent nickel steel, is used for applications down to minus 320° F; the other, an austenitic stainless grade, is used for service down to minus 425° F.

"Page 87 also has a series of graphs comparing certain mechanical properties of aluminum alloy 5083 and SAE 1034 steel, presumably from the standpoint of cryogenic suitability.

"The article states that aluminum alloy 5083 is most effective for cryogenic applications. SAE 1034 steel is not known for cryogenic properties and is a grade which the steel industry would never recommend for low temperature applications.

"To be wholly valid, these graphic comparisons should have been made between aluminum alloy 5083 and either or both of the two steels mentioned above."

Here's How You Can Win $1000 This Month . . .

. . . In STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—February, 1960) to help you accomplish an important personal or company objective.

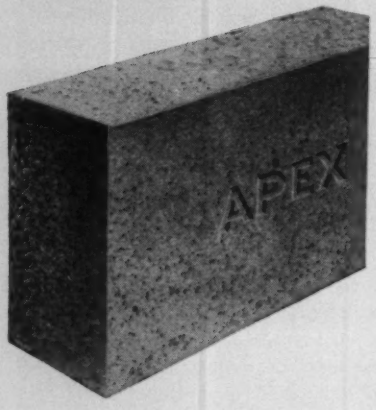
Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Entries will be judged by a committee of STEEL editors. All letters become the property of STEEL Magazine.

This month's deadline: Apr. 1, 1960. Send your entries to: Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

BIG STEP FORWARD IN LADLE LINING LIFE



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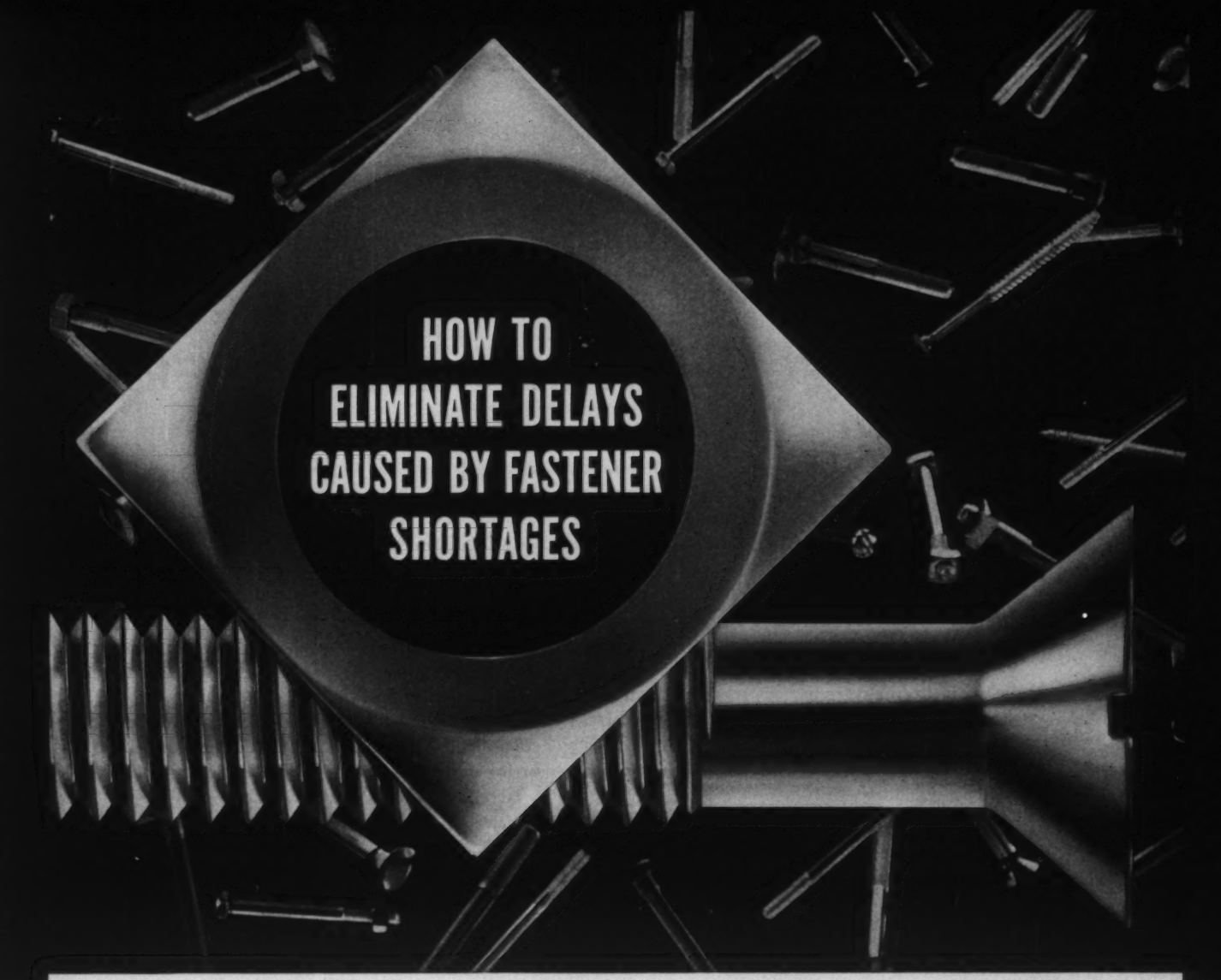


Your Republic Bolt and Nut Distributor Can Help You

From his complete inventories, he can give you quick delivery of fasteners of any type and size —in any quantity, from a single bolt . . . to broken or full case lots.

By so doing, your local Republic Bolt and Nut Distributor eliminates the trouble and expense of maintaining your own on-hand stocks. The net result is a reduction in over-all costs —to you, to your customers, and to the eventual consumer. Your local distributor therefore performs a vital function in today's industrial system.

He is also in a position to provide you with complete information on current fastener trends and techniques. It will pay you to familiarize yourself with the wide range of services he offers you. Contact your local Republic Bolt and Nut Distributor now.

Call your local distributor for quick deliveries of . . .

REPUBLIC Bolts and Nuts

REPUBLIC STEEL

HOW REPUBLIC PIG IRON SERVICE IN DEPTH HELPS FOUNDRYMEN EVERYWHERE

Pig iron *service in depth* is an exclusive Republic concept. It is designed to help you solve foundry production and metallurgical problems—designed to help you produce better castings most efficiently, economically, and profitably.

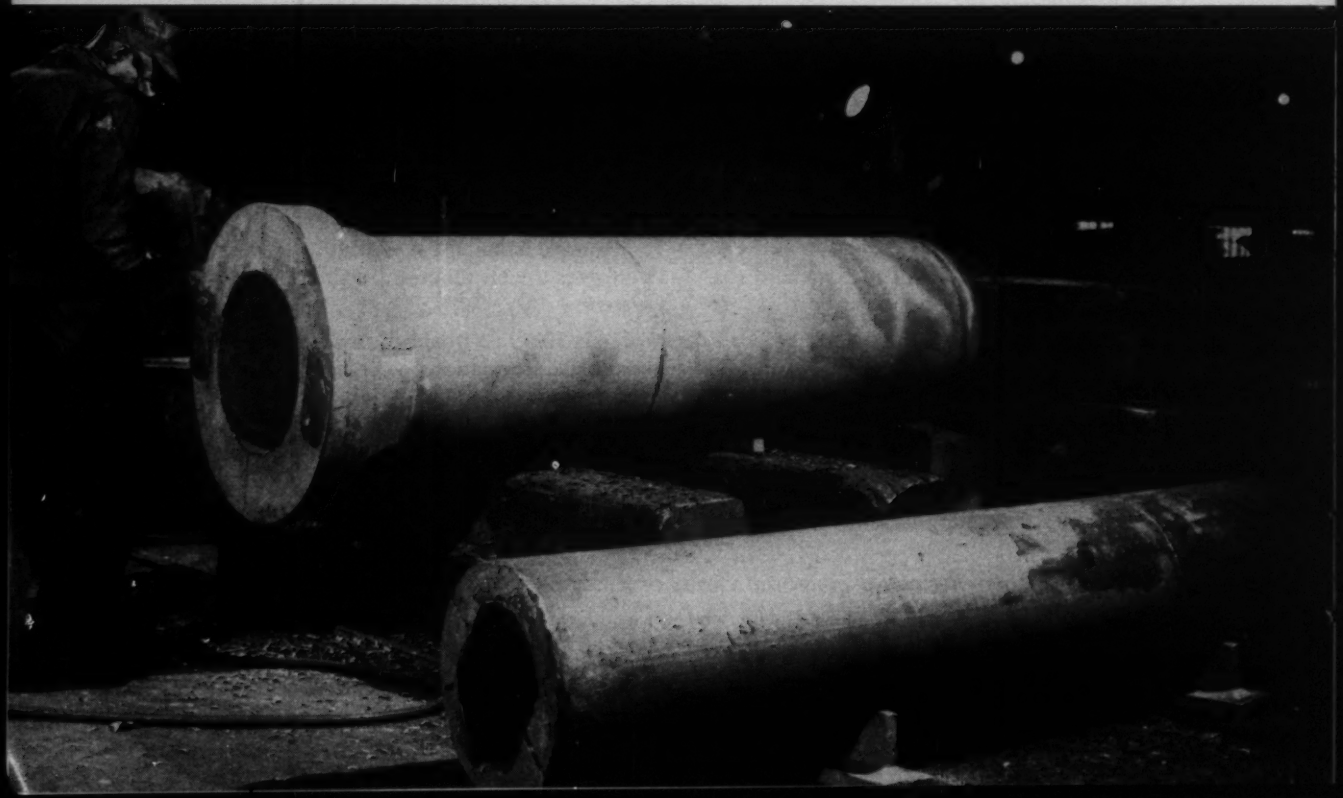
Here is how *service in depth* helps foundrymen everywhere.

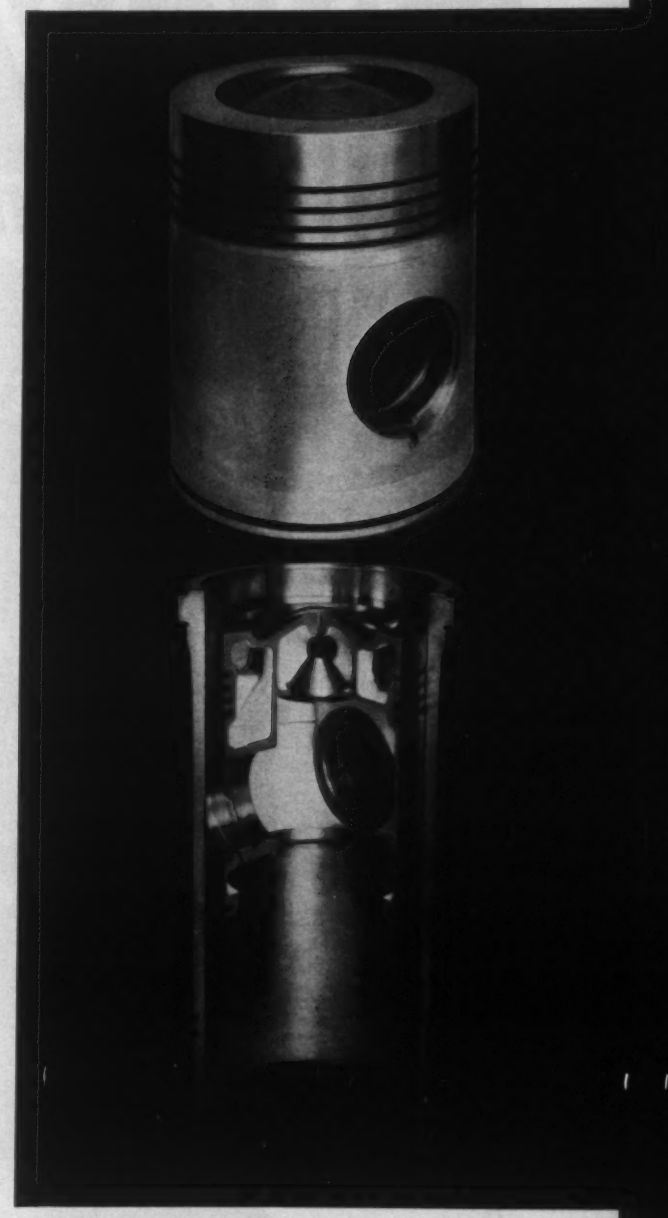
First, Republic is the only producer of both Northern and Southern Irons. This means you can select the proper grade from the most complete line of merchant pig iron available in the industry. Northern grades include Chateaugay, Malleable, Bessemer, Foundry, and Basic. Southern furnaces produce Foundry and Basic.

Then, Republic provides expert metallurgical service to assist you in selection, application, and processing. Republic Pig Iron Metallurgists are frequent and welcome visitors in hundreds of foundries. They have at their fingertips information on the latest processes and techniques available for improving castings, and for expanding their use and sale. Their suggestions often result in improved operations, increased production efficiency, and in recapturing business lost to other methods of fabrication.

Service in depth is available now. Clip and mail the coupon for obligation-free metallurgical service, or for more information on Republic Pig Irons.

Here are three examples of pig iron *service in depth.*





1. UNIFORM CHEMISTRY HELPS PRODUCE HIGHEST QUALITY DIE SETS. The Producto Machine Company, Bridgeport, Connecticut, casts die set parts using only raw materials with a definite known analysis, including Republic Pig Irons. The year-in, year-out uniform chemistry of these fine irons helps Producto produce high quality, laboratory-controlled castings. The company has found that there is no better, no more economical means for insuring strong, flaw-free, easy-to-machine castings.

2. CHATEAUGAY AGAIN PROVED IDEAL BASE METAL FOR DUCTILE IRON. Problem: Design a diesel engine piston with high mechanical strength, minimum weight, maximum wear- and heat-resistance, low ultimate cost. Using Chateaugay Pig Iron as the base metal, Hunt-Spiller Manufacturing Corporation, Boston, Massachusetts, successfully met all of these requirements in developing ductile iron diesel pistons as a replacement for aluminum. High total carbon and unusually low phosphorus, silicon, and manganese suit Chateaugay perfectly to ductile iron use. Inherently excellent physical properties are maintained in the ductile form assuring strong, flaw-free casting accurate to patterns and shapes.

3. METALLURGICAL SERVICE BENEFITS FOUNDRY'S CUSTOMER. On the advice of a Republic Pig Iron Metallurgist, Atlantic Foundry Company, Akron, Ohio, switched to Chateaugay Pig Iron for ram and cylinder castings used in hydraulic presses. The result: stronger castings, better machinability, higher wear-resistance, and a 21% saving to the customer. The value of Republic metallurgical service is pointed out in this statement by Atlantic's Vice President of Iron Foundry Operations. "When we have a foundry problem and put in a call for help, your metallurgical engineers are Johnny-on-the-spot, talking a language we can understand. Then it's not long before the problem is solved."

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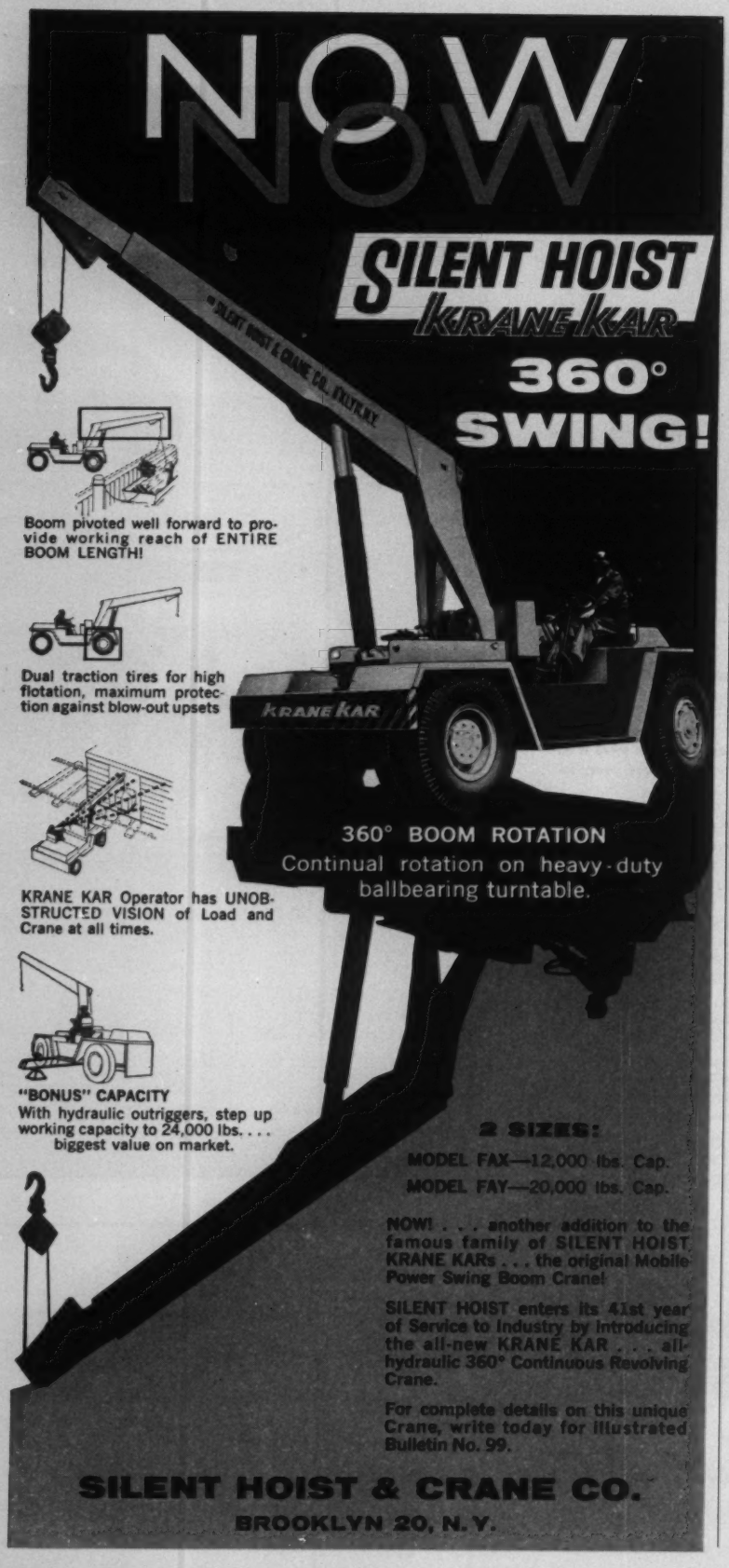
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CALENDAR
OF MEETINGS

Mar. 6-9, American Society of Mechanical Engineers: Gas turbine power and hydraulic conference, Rice Hotel, Houston. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Mar. 7-8, Steel Founders' Society of America: Annual meeting, Drake Hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Mar. 7-9, Association of Iron & Steel Engineers: Western meeting, St. Francis Hotel, San Francisco. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Mar. 10-11, Chamber of Commerce of the United States: National Construction Industry Conference, National Chamber Bldg., Washington. Chamber's address: National Chamber Bldg., Washington 6, D. C.

Mar. 13-15, National Association of Waste Material Dealers: Annual meeting, Waldorf-Astoria Hotel, New York. Association's address: 271 Madison Ave., New York 16, N. Y. Administrator: M. J. Mighdoll.

Mar. 14-18, National Association of Corrosion Engineers: National conference and corrosion show, Memorial Auditorium, Dallas. Association's address: 1061 M&M Bldg., Houston 2, Tex. Executive secretary: T. J. Hull.

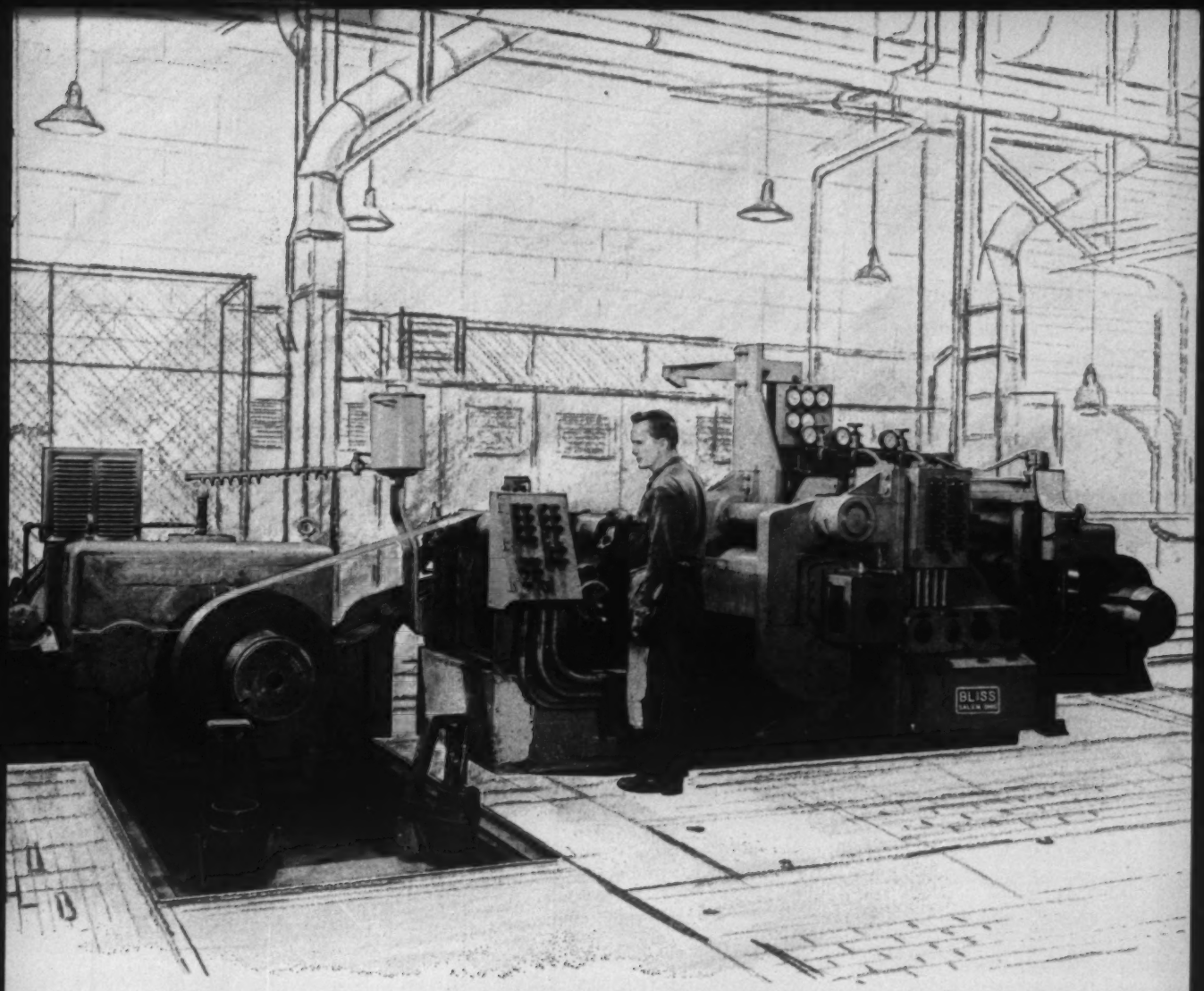
Mar. 14-18, National Association of Manufacturers: Institute on Industrial Relations, Hollywood Beach Hotel, Hollywood, Fla. Association's address: 2 E. 48th St., New York 17, N. Y. Executive vice president: Charles R. Sligh Jr.

Mar. 15-17, Society of Automotive Engineers Inc.: National automobile meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 16-18, Electronic Industries Association: Spring meeting, Statler-Hilton Hotel, Washington. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

Mar. 17, National Industrial Conference Board Inc.: General session for all associates, Somerset Hotel, Boston. Board's address: 460 Park Ave, New York 22, N. Y. Secretary: Herbert S. Briggs.

Mar. 21-23, American Management Association: Special manufacturing conference, LaSalle Hotel, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.



How Bliss helps ease the tension at Acme Steel

This new rewind line, designed and built by Bliss' Rolling Mill Division, helps Acme Steel's Riverdale, Ill., plant achieve a higher quality cold rolled strip.

All strip in widths from 2" to 26" and gages of .050" and thinner is run through the line before annealing. Between the line's mandrel-type payoff reel and the tension reel are a pinch roll and an electrically-controlled bridle which the operator sets for various strip widths and gages.

The tension applied between the bridle and the tension reel "relaxes" the strip so that it won't stick when it goes through the annealing furnace. Maximum speed through the rewind line is 1000 feet per minute and it is in operation almost continuously.

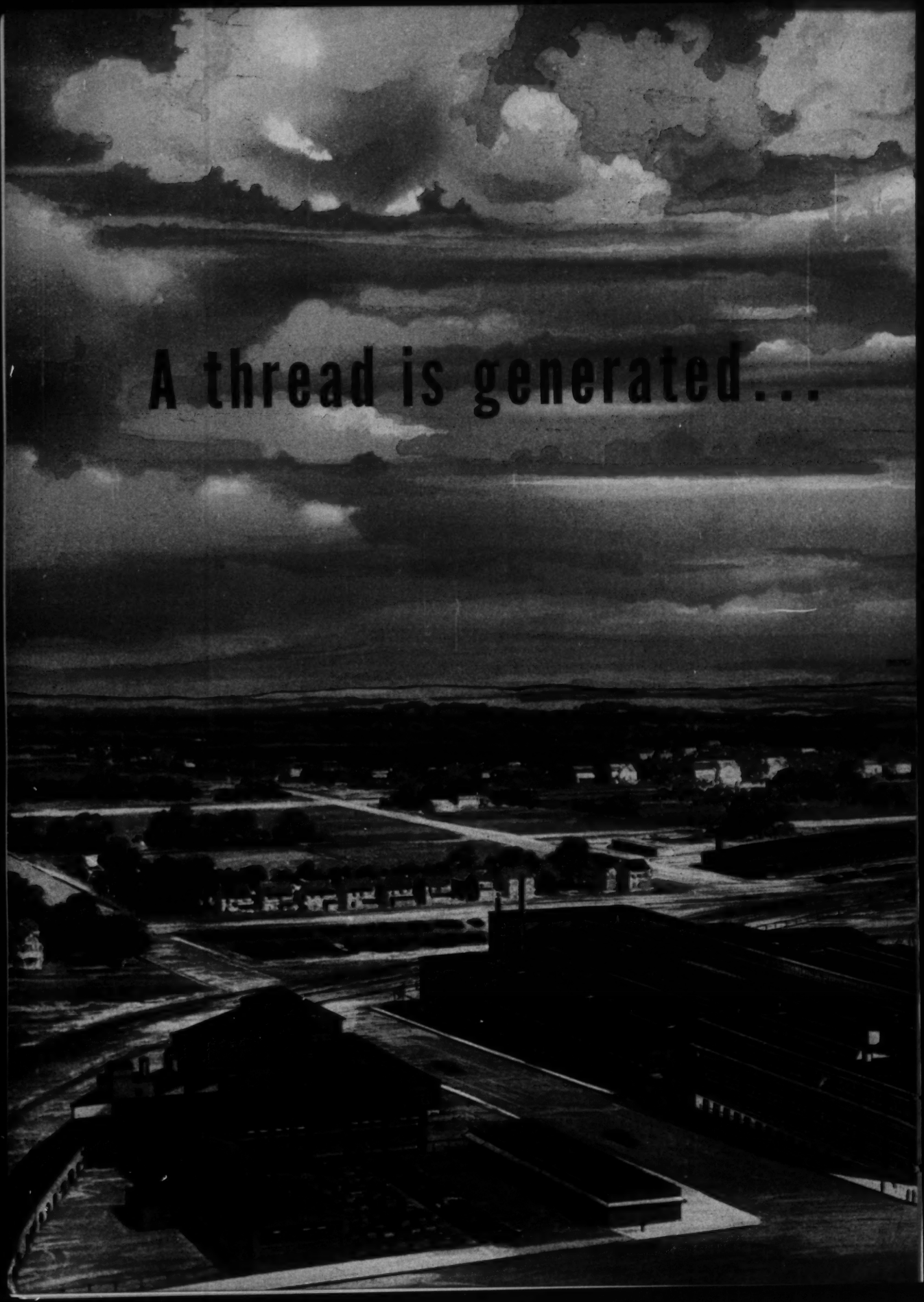
It's another illustration of how Bliss engineering can solve a metal rolling plant's problems. For other examples of Bliss Rolling Mill installations, write today for your copy of the 84-page Bliss Rolling Mill Brochure, Bulletin 40-B.

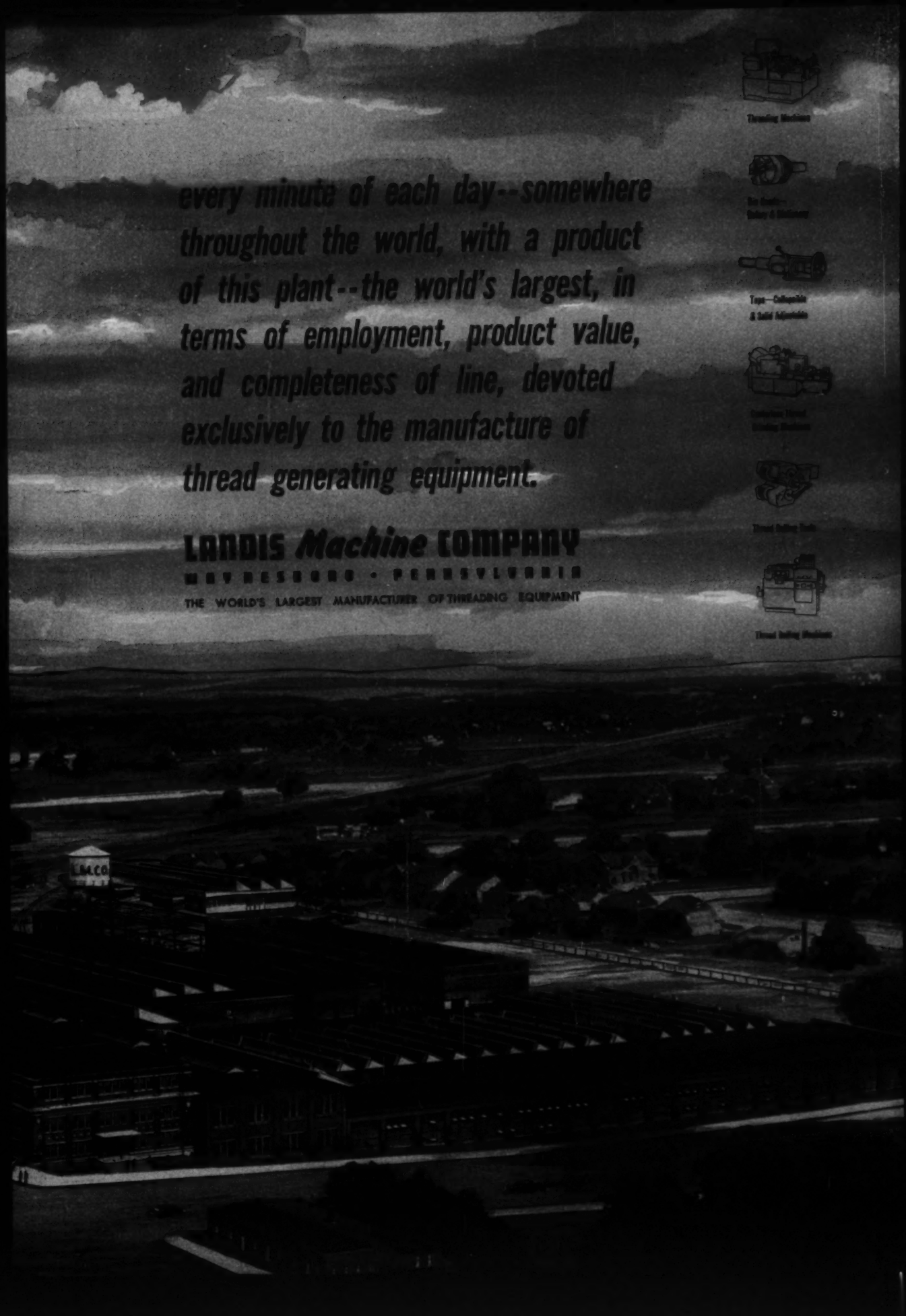
BLISS
SINCE 1857

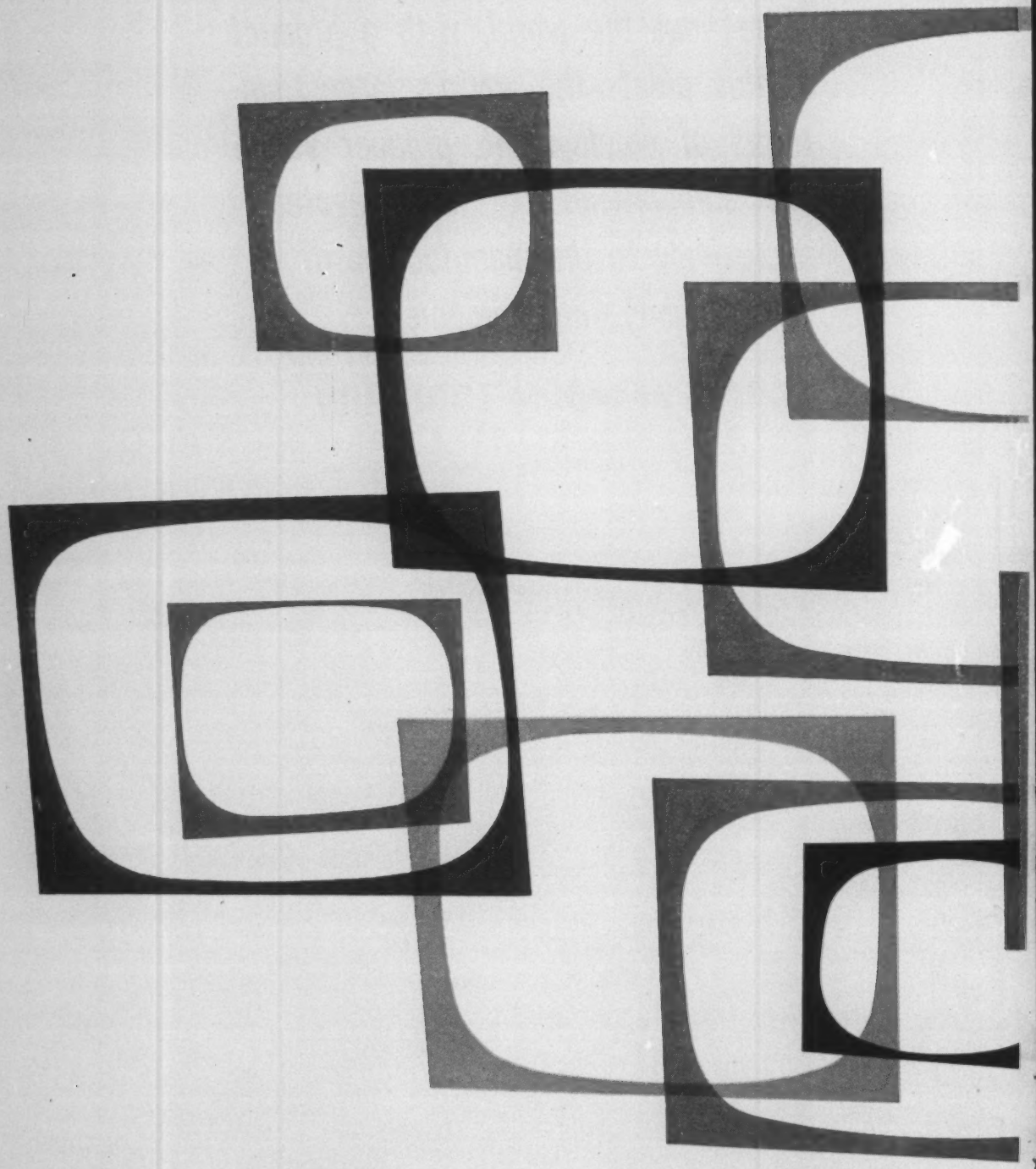
Bliss is more than a name... it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio


A thread is generated...


every minute of each day--somewhere throughout the world, with a product of this plant--the world's largest, in terms of employment, product value, and completeness of line, devoted exclusively to the manufacture of thread generating equipment.
LANDIS Machine COMPANY
WAYNESBORO • PENNSYLVANIA
THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT



Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

Better products through better methods and steels

How zinc-coated steels improve the profit picture in TV-set manufacturing

Solid savings in TV manufacturing often come in small ways. Take the case of the TV masks once made of cold-rolled steel and painted on both sides to stave off corrosion. When the switch was made to Weirzin electrolytic zinc-coated steel, protective painting bowed out. Because Weirzin's uniform, corrosion-resistant surface is impervious to heat and humidity, the mask's interior is left as is. The exterior is painted purely for decoration—and with Grade A results since Weirzin comes chemically treated to provide a superior bonding surface for paint. Weirzin electrolytic zinc-coated steel is but one of many fine steels produced by Weirton Steel Company—improving products, methods *and* profits throughout industry.

WEIRTON STEEL
Weirton, West Virginia

You can do **two things** to guard yourself against cancer: Have an annual health checkup. Alert yourself to the seven danger signals that could mean cancer:

1. Unusual bleeding or discharge. 2. A lump or thickening in the breast or elsewhere. 3. A sore that does not heal. 4. Change in bowel or bladder habits. 5. Hoarseness or cough. 6. Indigestion or difficulty in swallowing. 7. Change in a wart or mole.

If your signal lasts longer than two weeks, go to your physician. Give him the chance to give you the chance of a lifetime.

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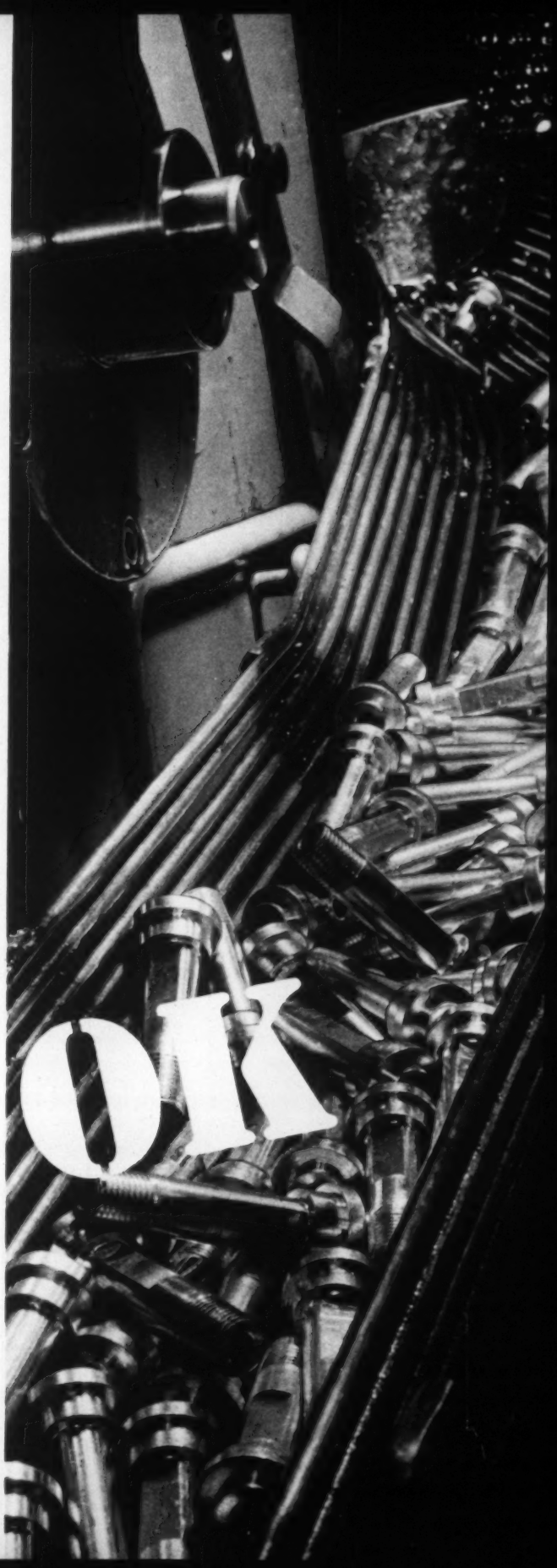
you have faith that the sun will rise tomorrow...

...don't you wish
you had that much faith
in the performance of the

specialty steels

you use?



Science estimates the sun will maintain its present rate of radiation for over 35 billion years . . . will rise and set with sundial precision more than 12 trillion times. That's predictable performance!

predictable as tomorrow's sunrise...

Carpenter's new MEL-TROL®

steelmaking process assures maximum uniformity in specialty steels ...lot after lot after lot!

Heart of the problem! Perhaps you dismissed those last rejects as a "bum lot of steel". Chances are you would have been closer to the truth to have called it "good" steel with a weak core or centerline. For until recently, this was the *one* area where all the finest quality controls in the steel industry were unable to prevent or even to detect segregation during production of some heats.

Predictable performance... patented! *Carpenter's* exclusive MEL-TROL process includes a patented mold which reduces segregation of harmful impurities during solidification of the ingot. This ingot is more uniform, and freer from porosity and segregation. That's why only Carpenter specialty steels give you such cleanness, soundness, toughness in every zone . . . *in every bar*. That's why you know *in advance* what results you will get.

Off-the-shelf delivery! Your nearby *Carpenter* SERVICE-CENTER stocks a wide range of grades, sizes and shapes of Tool and Die Steels — Stainless Steels — Special-Purpose Alloy Steels. Other specialty steels available from Carpenter are: High Temperature Alloys — Electronic, Magnetic and Electrical Alloys — Tubing and Pipe — Fine Wire Specialties.

New concepts in service! With the addition of new melting and finishing facilities our capacity is nearly doubled. Better-than-ever quality . . . more research . . . more technical assistance . . . more local warehouses . . . *Carpenter* is growing bigger and better in all directions. Building upon a long history of pride in craftsmanship . . . backing up our faith in the future with dollars on the line . . . we are combining the best of modern technology and traditionalism. No wonder more and more men in industry, especially customers who know us best, refer to *Carpenter* as . . . *a new company 70 years old.*

Carpenter **steel**

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

local service from coast to coast!

stainless steels! tool and die steels! special-purpose alloy steels!

Check your nearby Carpenter SERVICE-CENTER *first:*

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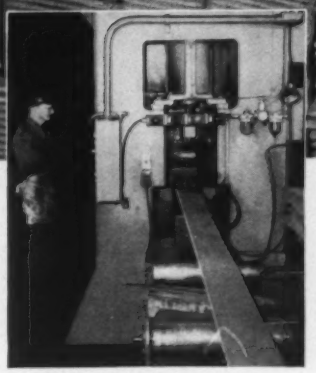
The Carpenter Steel Company, Reading, Pa.

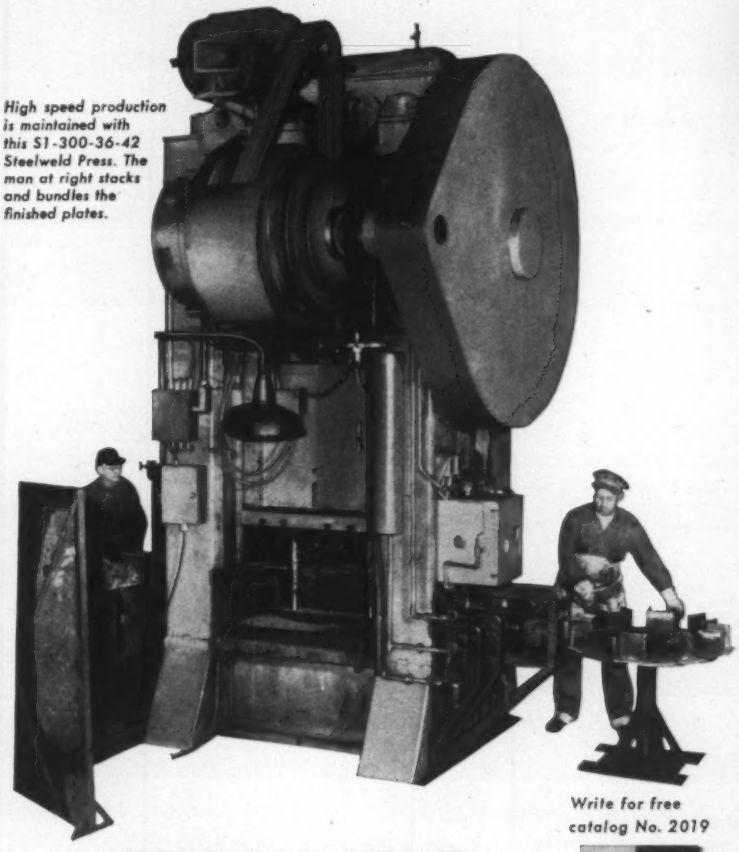
STEELWELD SINGLE POINT PRESS produces 400,000 mine plates monthly

These bundles of finished "West Virginia" brand mine roof bolt washer plates represent little more than an hour's production on the Steelweld Press.



Long strips of steel feed through from side of machine automatically.

High speed production is maintained with this S1-300-36-42 Steelweld Press. The man at right stacks and bundles the finished plates.



A single-point straight-side 300-ton Steelweld Press at the West Virginia Works of Connors Steel Division, H. K. Porter Company, Inc., Huntington, West Virginia, is used exclusively for the production of one item—"West Virginia" brand mine roof bolt washer plates. With an operating speed of 40 strokes per minute, very little time is lost with this machine.

Strips of flat steel are fed into one side of the press, and the completed washer plate parts come out of the other. Movement of the steel through the machine and punching are done automatically.

"West Virginia" brand mine roof bolt washer plates are produced in 3—4—6 and 8 inch squares and thicknesses of ¼ and 5/16-inch. A hole is provided in the center with a saucer-like elevation around it. A second smaller hole is punched simultaneously about midway between the center bolt hole and one corner for insertion of a "Sky Hook" or roof bolt suspension arm.

Steelweld Presses have many outstanding features to offer, as Connors Steel Division and other leading users in automotive, agricultural equipment, heavy fabricating and other industries have learned. Our sales engineers will be glad to give you the details.

Write for free catalog No. 2019

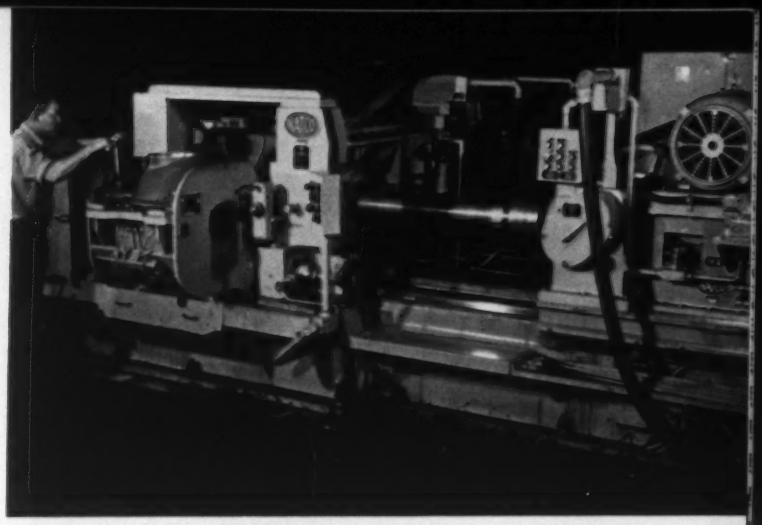
STEELWELD
STRAIGHT-SIDE PRESSES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION ○ THE CLEVELAND CRANE & ENGINEERING CO. ○ 7802 E. 280 ST. ○ WICKLIFFE, OHIO

NATCO

Flopover cradle makes for unobstructed top loading. Holes are bored in two directions without change of setup in this off-highway truck differential carrier assembly.



L-shaped Natco special for boring right-angle holes has both rough and finish cycles. It handles two sizes of parts.

Handling Ease Alone Justifies This Natco Special

This husky Natco does one job well—It bores big holes in hard-to-handle, heavy cast steel parts.

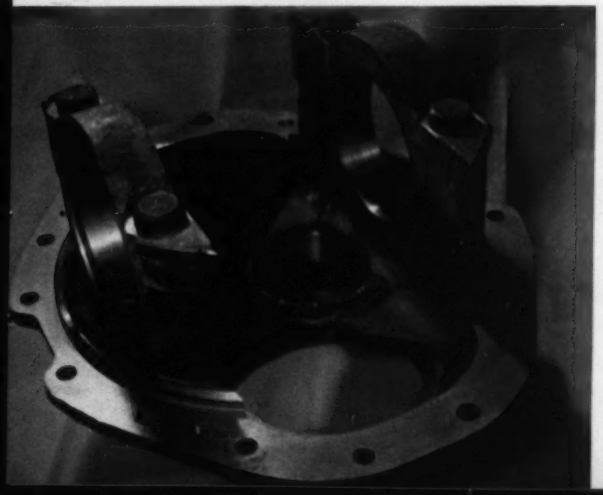
International Harvester Co., Melrose Park, Ill., cuts handling time in half with this Natco special, and look what else it gets: better finish on the bores, longer tool life, improved alignment, tighter tolerances, and more parts per hour. In short, higher quality and greater productivity. And a standard boring mill is released for general purpose chores.

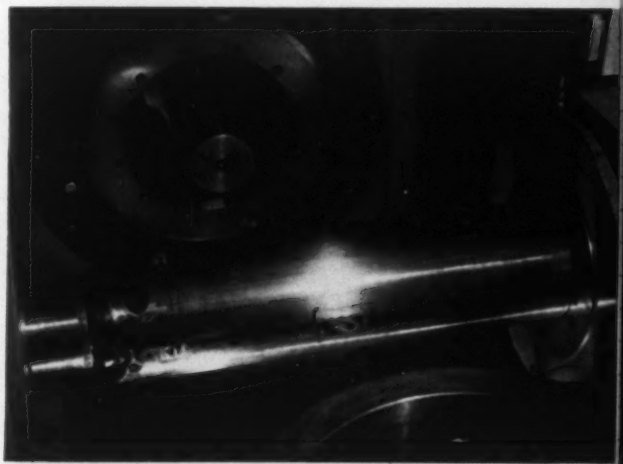
For such extra benefits from specials, call your Natco representative today.

NATCO

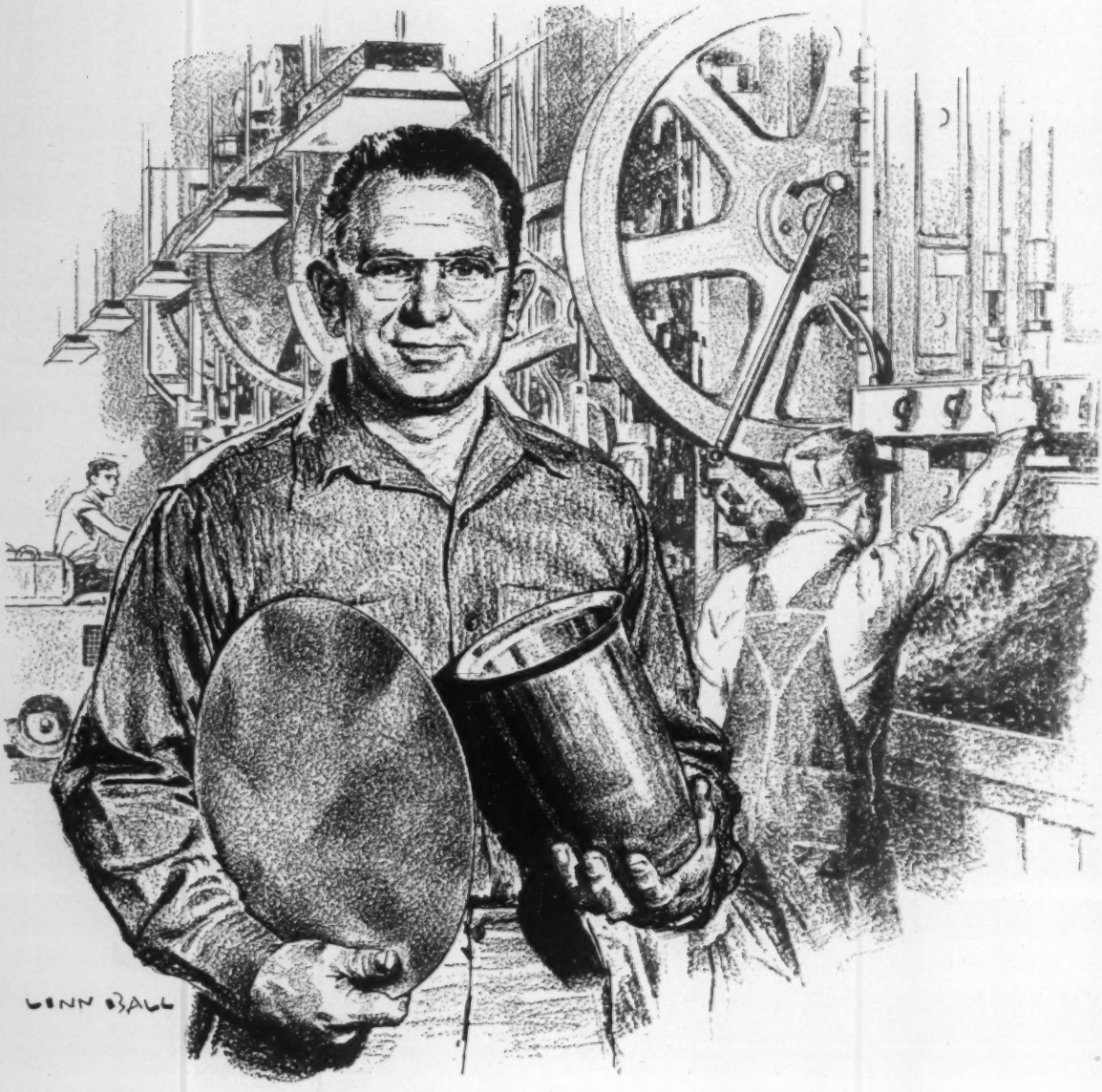
The National Automatic Tool Company, Inc., Richmond, Indiana

Only two boring bars with expanding bit heads are needed to bore these several different diameters and faces.





Bits expand from boring heads. Head entering at top bores 4.725″ and 10.250″ holes at the same time.



"For extra deep drawing we like Sharon Quality Stainless Steels"

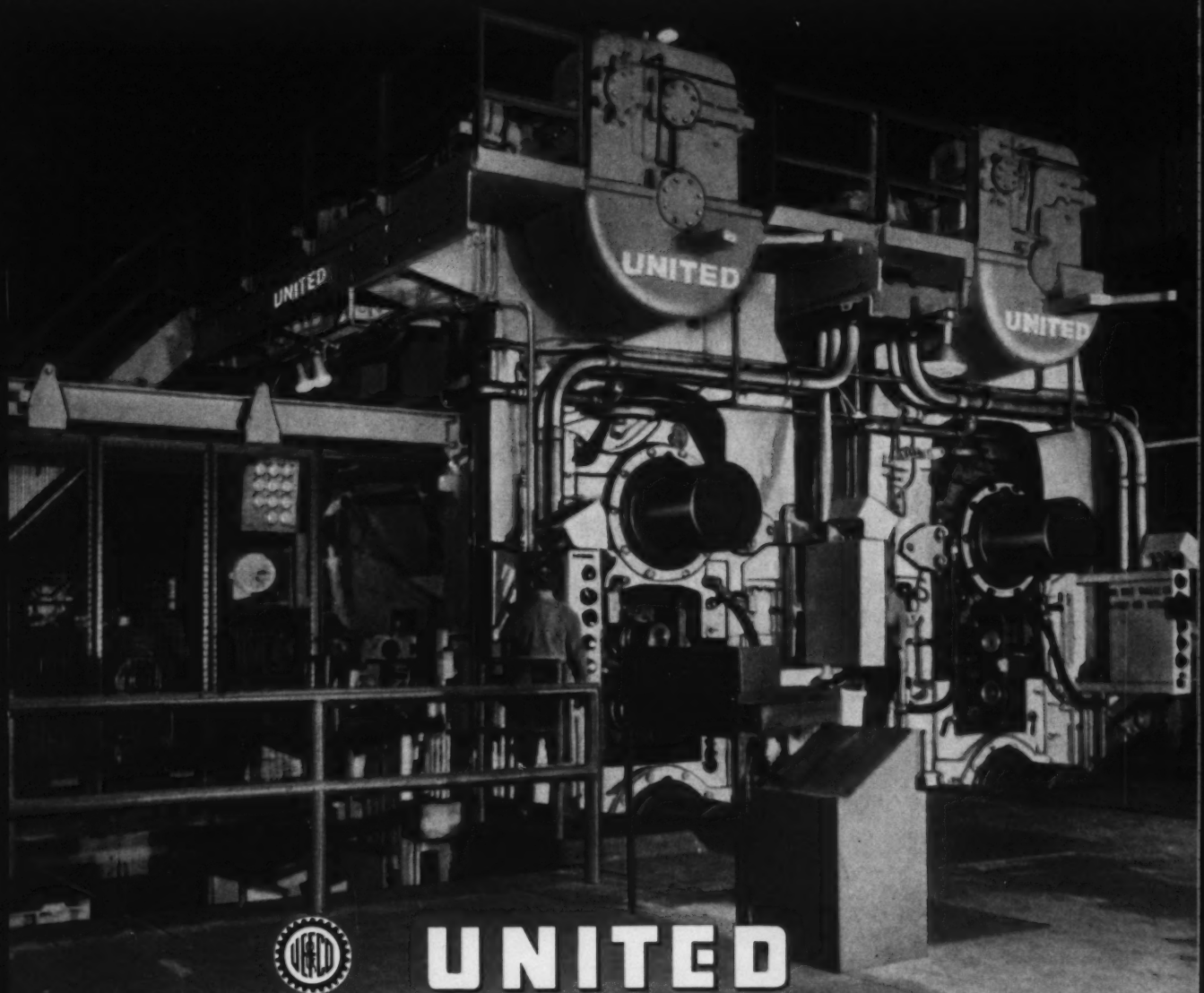
— WALTER MARKOWSKI, Pressroom Foreman
S. W. FARBER, Inc.

"Here at Farber we really put stainless steel through severe tests," says Walter Markowski, pressroom foreman. Our product design calls for extra deep draws, delicate rolled edging and bright flawless finishes. Over the years we have found a most dependable source of prime stainless steels in the *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL**

UNITED®

4-HIGH 2-STAND TANDEM TEMPER PASS MILL



UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES. Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designer and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

How CLAD-REX® can simplify production methods and reduce costs

Clad-Rex is a vinyl-metal laminate. Specifically, a calendered, semi-rigid poly-vinyl chloride film bonded to sheet metal. It is obviously a material that will give your product the almost unlimited color, style and texture of printed film *plus* the strength of steel or the weight advantage of aluminum. All alloys and tempers of aluminum and steel (including galvanized and aluminized) are commonly used. Other metals can also be used where their special properties are important to end product performance.

However, not so obvious is the practical nature of Clad-Rex. It combines finish and sheet metal into one material that can be fabricated in almost as many ways as *un*finished sheet metal. The result is an unusual opportunity for you to simplify and reduce the cost of normal manufacturing procedures. These savings in time, labor, equipment, factory floor space, rejects, etc. are worthy of close examination.

Here's why . . .

Clad-Rex is pre-finished

Unlike *un*finished sheet metals, Clad-Rex is finished when you get it. Unlike other pre-finished metals, Clad-Rex offers unusual resistance to abrasion. Normal fabricating procedures and shop handling do not damage the vinyl surface of Clad-Rex. In most cases, existing tooling can be used without change—even for deep drawing.

Unfinished metal—complex methods

The inherent ability of Clad-Rex vinyl-metal laminates to simplify production procedures and sharply reduce manufacturing costs can best be described by a comparison.

Consider, for example, a cabinet for television—Using *un*finished sheet metal, the cabinet begins in forming and drawing. Next, cleaning to remove drawing compounds, etc. then, grinding and/or polishing. Now the various attachments and supports for the television and chassis are welded in position.

The next phase is preparation for finishing. This includes several steps of cleaning and surface preparation—often special treating, such as bonderizing against corrosion.

Finally, finishing begins with prime coating. Often multiple finish coats. Then, baking. Through this sequence is inspection and re-inspection all along the way.

Now comes assembly, and more inspection. A slip of a screw driver here, or an abrasion in handling produces a reject. A reject means a complicated reverse process to disassemble, strip the paint, re-buffing and then back through the finishing line all over again.

Clad-Rex—simple, less cost

Now consider the same television cabinet. Only this time made of Clad-Rex vinyl-metal laminate—

Clad-Rex comes out of the forming dies, through inspection and directly to assembly. No buffing to remove die marks . . . no finishing of any type . . . usually no rejects during assembly either.

The time, labor, equipment, floor space, etc., required are much less. All represent a substantial savings when you use Clad-Rex vinyl-metal laminate *instead of unfinished sheet metal.* That's why, although Clad-Rex costs more going into your plant, your product made of Clad-Rex can cost less when you ship it.

A source of engineering service

Clad-Rex interest in helping you extends into your own plant. A Clad-Rex Fabricating Engineer is available to show your production people how easy it is to process Clad-Rex. Furthermore, Clad-Rex operates a fully staffed and equipped research laboratory. Its facilities are devoted to customer service as well as improving Clad-Rex products.

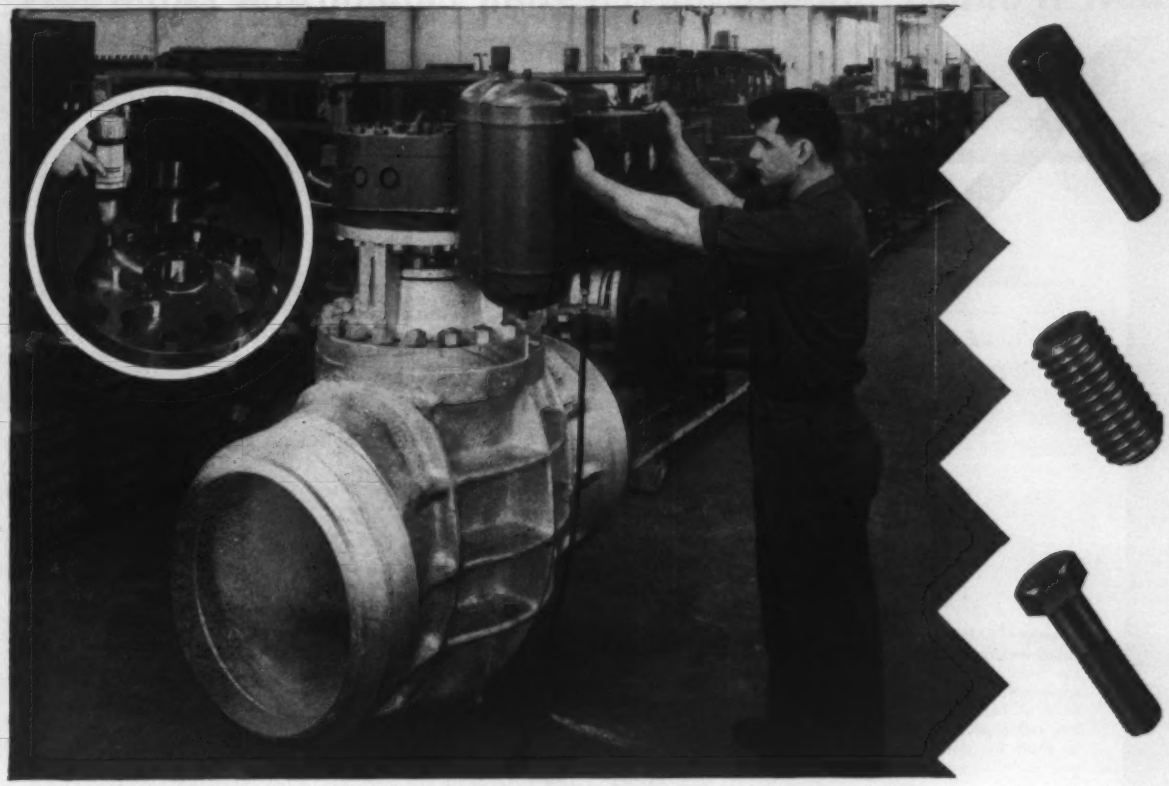
Write and describe your product. See how Clad-Rex can work its broad effect on your manufacturing methods and costs. No obligation, of course.

COMPARISON OF FABRICATING PROCEDURE

Unfinished Sheet Metal	Clad-Rex Vinyl-Metal Laminate
FORMING	FORMING
CLEANING	CLEANING
INSPECTION	INSPECTION
GRINDING, ETC.	
INSPECTION	
SUB-ASSEMBLY	SUB-ASSEMBLY
INSPECTION	INSPECTION
CLEANING	
BONDERIZING	
INSPECTION	
FINISHING (multiple coats as required)	
INSPECTION	
STRIPPING of rejects	
REFINISHING	
INSPECTION	
FINAL ASSEMBLY	FINAL ASSEMBLY
INSPECTION	INSPECTION
STRIPPING of rejects	
REFINISHING	
INSPECTION	
RE-ASSEMBLY	
INSPECTION	
SHIPPING	SHIPPING

VINYL-METAL LAMINATES BY **CLAD-REX** DIVISION OF SIMONIZ COMPANY
2105 Indiana Avenue • Chicago 16, Illinois
Telephone: VIctory 2-7272

IT PAYS TO STANDARDIZE ON STANSCREW



Stanscrew service adds strength, lowers costs for Shafer Valve Company

The valve operators produced by Shafer Valve Company of Mansfield, Ohio are used to open and close large valves on gas pipe lines . . . often in remote locations, many miles from human supervision. They are subject to sudden surge loads which cause extremely high stresses . . . and their critical importance demands unfailing reliability of all components.

Shafer formerly manufactured their own fasteners for this demanding application from a special high strength steel. Then their distributor arranged for a visit from Stanscrew's fastener specialist. He quickly established that Stanscrew's heat-treated "Carbon Restoration" cap screws, correctly applied, could provide even greater fastener strength . . . and at a significant saving in cost.

The Stanscrew fastener specialist may be able to make similar savings or improvements in your assembly operations. For he brings to your application the experience and facilities which have made Stanscrew a leading supplier of fasteners to the top names in American industry for over 80 years. And he can select money-saving answers to your problems from a complete line of over 5,000 different types and sizes of standard fasteners . . . always in stock, quickly available.

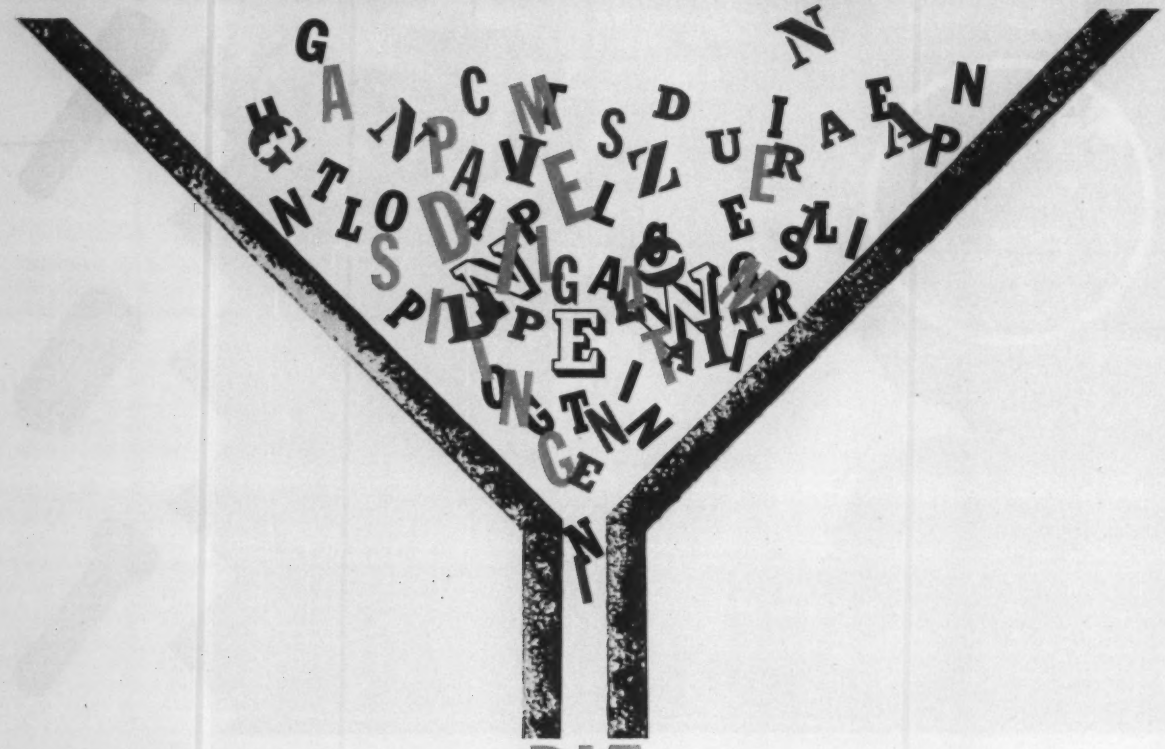
Whatever your fastener requirements, call your nearby Stanscrew distributor today. He will arrange for a prompt visit from the Stanscrew fastener specialist.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

HOW A SINGLE SOURCE SOLVES YOUR PRODUCTION PROBLEMS



DIE CASTING
NEW DURA-PLATE ELECTROPLATING
METAL STAMPING
POLISHING-PAINTING
ANODIZING

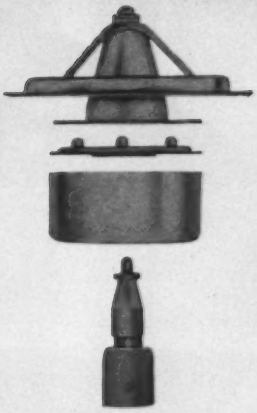
Simply funnel your "specs" into the hands of Brown-Lipe-Chapin and you'll automatically eliminate costly, time-consuming piecemeal orders to crowds of suppliers! B-L-C is equipped to take over your complete production . . . lock-stock-and-barrel. We form metal parts—die cast, pressed, rolled or stretch bent—then polish, plate, anodize, paint and ship them for you from either of our plants at Elyria, Ohio, or Syracuse, New York. B-L-C's diversified facilities provide a single source to give you superior economy, quality, on-the-button scheduling from initial tooling to final shipping. What's more, B-L-C's skilled engineers closely supervise your job from the design stage to finished product, to give you satisfaction in every detail! Call or write Brown-Lipe-Chapin, Syracuse, New York.

GM GENERAL MOTORS

RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION

AGAIN-



EXPLODED VIEW OF AUTOSTAT® made by FULTON SYLPHON DIV., Robertshaw-Fulton Controls Co., shows impact extruded cup made from Revere Copper Rod. Other parts of this superior thermostat used in pressurized cooling systems in automobiles and other automotive equipment, are made of 70/30 Revere Brass Strip.

Revere helps "fit the metal to the job"

AND A LEADING MANUFACTURER OF AUTOMOTIVE THERMOSTATS IS ABLE TO PRODUCE A SUPERIOR PRODUCT FOR LESS MONEY

That little unimportant-looking copper cup shown above originally posed a king-sized production problem. It is a critical part of a newly designed automotive thermostat made by the Fulton Sylphon Division of the Robertshaw-Fulton Controls Co., Knoxville, Tenn.

In the early stages this copper cup was machined from free cutting copper rod, but this proved costly due to the high rate of scrap from the machining operation and the relatively high cost of turning out the machined part. At this point Revere Technical Advisors got together with Fulton Sylphon Engineers and the possibility of an impact extrusion was discussed. Revere T.A.'s in turn contacted suppliers who might furnish these extrusions in copper, to see whether or not they could be produced economically and to the demanding specifications required.

After exhaustive tests it was found that the cup could be impact extruded to meet the exacting hardness specifications of Fulton Sylphon. During its development, many problems involving temper, grain size and control of the chemical composition of the copper rod had to be solved.

In addition to the Copper Cup, Revere also supplies 70/30 Brass Strip from which other parts of the AUTOSTAT® are fabricated.

Said a Fulton Sylphon purchasing agent, "When you ask Revere for help you really get results."

This is still another case of how Revere, a supplier, working with still another supplier, was able to help its customer produce a superior product for less money. Why don't you take advantage of this service?

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue

New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

AVAILABLE IN ¾" AND 1¼" CAPACITIES. Shown at right is Model 18-B-7 with ¾" rated capacity. Write for Bulletin 18-11.

NEW

GARDNER-DENVER IMPACT WRENCHES

Model 18-B-9 impact wrench with 1¼" rated capacity. Write for Bulletin 18-15.

hit harder...last longer

Here are two new lightweight, easy-to-use impact wrenches that hit harder—yet don't wear themselves out. They're the result of intensive Gardner-Denver engineering to develop a powerful, long-lasting impact mechanism. The combination of a fast-accelerating air motor and a new, patented clutch mechanism assures positive starts, efficient impacting and lowest maintenance.

And look at these big advantages: light weight—lowest weight possible consistent with high-power output . . . easily disassembled for service . . . no torque reaction . . . reversing lever protected from accidental engagement but readily accessible when needed.

For *your* production or maintenance jobs, get the complete story on the new Gardner-Denver impact wrenches. Contact your nearby Gardner-Denver air tool specialist or write for bulletins.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

A complete heat treating line is more economical to purchase with General Electric system engineering aid and "one-source" manufacturing responsibility.

HEAT
from General Electric

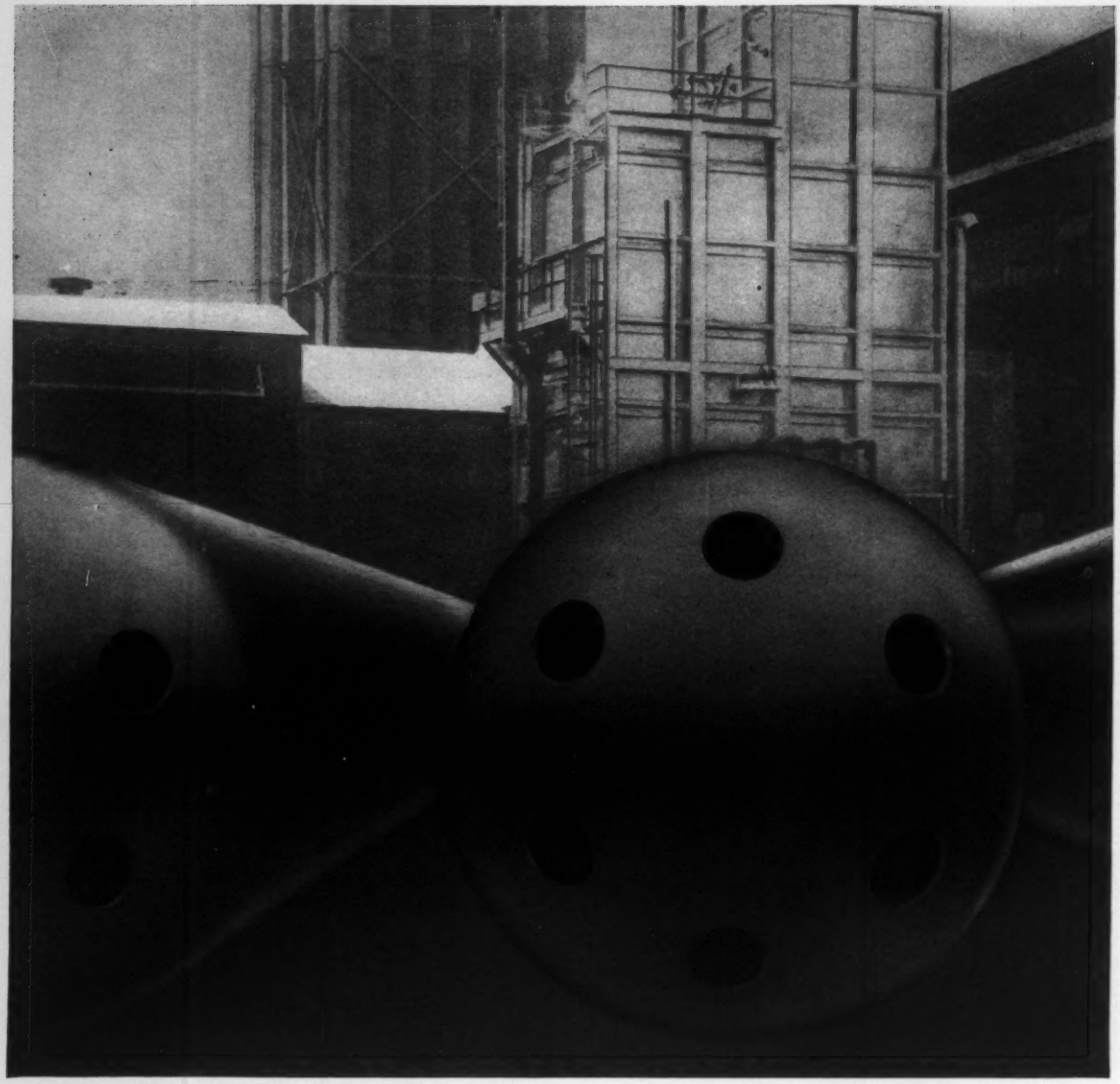
How General Electric performs as "one-source" supplier for your complete heat treating line

Next time you have a heat treating problem, don't begin a time-consuming, frustrating shopping tour for heating system components. Instead, call in your General Electric heating specialist. Get all the answers from this one representative who becomes your direct contact for your complete package including furnaces, materials handling equipment, control, atmosphere equipment, and accessories.

Example: A large producer of malleable and pearlitic malleable iron castings reduced his annealing cycle from 144 hours to 48 hours and cut man-hours 50 percent with a modern General Electric system. This complete G-E installation includes 25 electric furnaces, crane equipment and structure, quenching system, switchgear, control, and traveling hoists—all coordinated with General Electric engineering aid into an economical, high quality heat treating line.

Relieve yourself of heating system engineering problems. Call in General Electric when you modernize or install a new heat treating line. Contact your nearby G-E Apparatus Sales Office for "added value" assistance. 721-34

GENERAL ELECTRIC



AGAIN ! Granite City Steel calls on Air Products for reliable, low-cost oxygen

A new Air Products facility will soon supply Granite City Steel Company with an additional 90 million cubic feet per month of high purity oxygen for open hearth roof lancing. Air Products on-site plants have been supplying Granite City with oxygen since 1950, with capacity reaching 60 million cubic feet per month in 1958. As in the past, the new capacity will be available at no capital investment to Granite City.

Behind this major expansion in oxygen supply lies a record of Air Products technical services . . . a period during which Air Products development engineers worked with Granite City around the clock on roof jet practices. Air Products roof jets, such as those shown above, have resulted in dramatic increases in open hearth production.

Progressive steel companies across the nation have found it profitable to make use of Air Products up-to-date technical services and experience in oxygen supply. Let's talk about how *you* can put Air Products oxygen to work. Air Products, Inc., Allentown, Pa.

Air Products
. . . INCORPORATED

Are You Getting What You Pay For?

When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact... the qualities that they *pay* for — they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

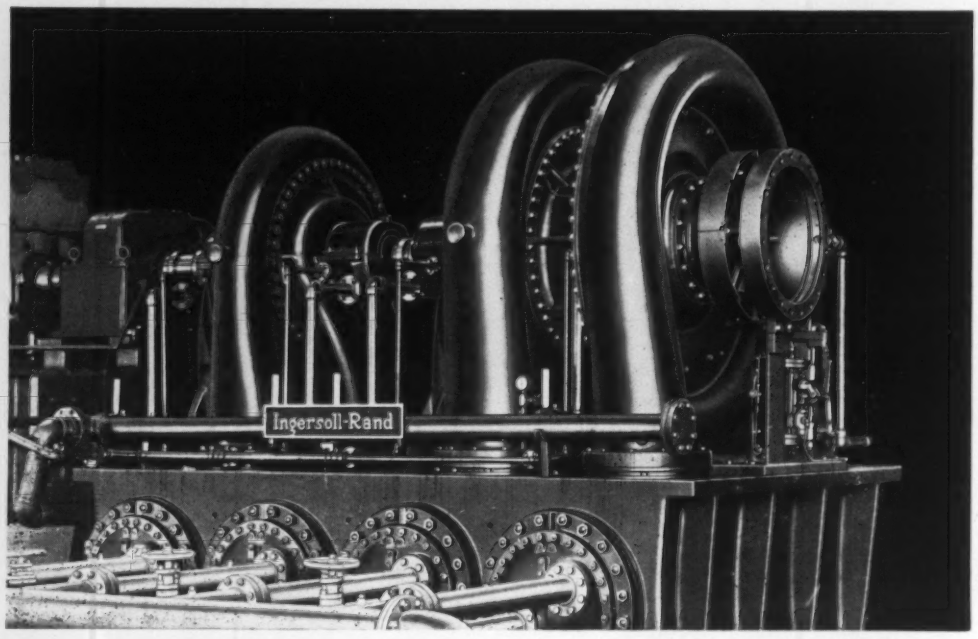
This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

ANOTHER **NEW DEVELOPMENT** FROM INGERSOLL-RAND



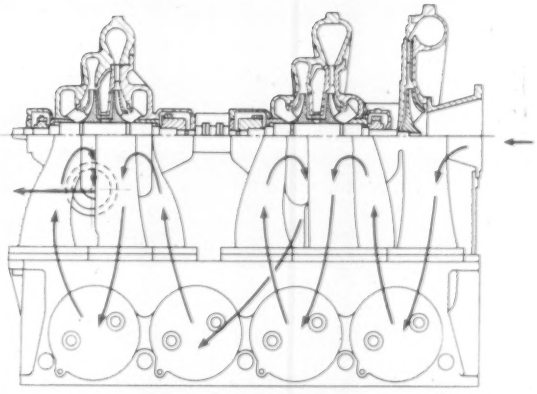
New 100 psi Centrifugal Air Compressor delivers up to 35,000* cfm

Five-Stage Intercooled Unit provides new efficiency and economy, with big savings in space and weight

THE Ingersoll-Rand CVM Centrifugal Compressor represents a new concept in the efficiency and economy of large-capacity air compression in the 100-125 psi range. With five compression stages and intercooling between each stage, it approaches the ideal *isothermal design*, delivering more air per horsepower than any other type of multi-stage centrifugal compressor.

The five impellers are mounted on two shafts, with two impeller pairs back-to-back to minimize axial thrust. The short shaft construction permits operation below first critical speed, minimizing vibration and extending the life of bearings and seals. The water-cooled intercoolers are integral with the machine base, have all water connections on the same side, and can be cleaned while the compressor is in operation.

The CVM Centrifugal Compressor is available in ratings to 35,000 cfm for discharge pressures to approximately 125 psi. For further details, see your I-R representative or write to Ingersoll-Rand.



Side elevation drawing of a CVM Centrifugal Air Compressor with top half of casing sections cut away to show impeller arrangement. Arrows indicate air flow through impellers and intercoolers.

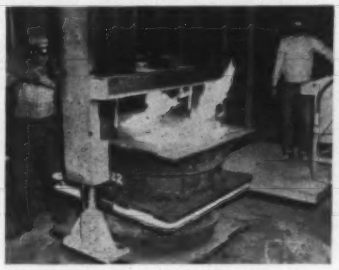
Ingersoll-Rand

12-988 11 Broadway, New York 4, N. Y.

*Higher capacities available with other designs.

COMPRESSORS • GAS & DIESEL ENGINES • PUMPS • AIR & ELECTRIC TOOLS • CONDENSERS • VACUUM EQUIPMENT • ROCK DRILLS

Process Could Refashion Steelmaking



A controlled pressure pouring process may help steelmen bypass ingots, soaking pits, and blooming mills. U. S. Steel Corp. has a pilot plant under construction to determine whether the method is practical for casting semi-finished steel shapes. Developed by Griffin Wheel Co., a subsidiary of American Steel Foundries, the process is being used to make railroad car wheels. STEEL will give a full report on it next week (March 7).

Survey Points Up Six Toughest Problems

The Buffalo Chamber of Commerce asked 446 companies to list the toughest problems facing them today: 59 per cent mentioned "more vigorous competition"; 54 per cent listed "high labor costs"; 47 per cent noted "high taxes"; 28 per cent complained of a "lack of trained employees"; 19 per cent mentioned "harmful legislation"; 11 per cent noted "material shortages."

How Major Unions Compare in Membership

A new Department of Labor study (based on 1958 figures) reveals these membership figures of major labor unions which are important to metalworking:

Teamsters	1,418,000	Operating Engineers	280,000
Auto Workers	1,027,000	Electrical (IUE)	278,000
Machinists	993,000	Communication Workers	255,000
Steelworkers	960,000	Railroad Trainmen	200,000
Carpenters	835,000	Electrical (UE)	160,000
Electrical (IBEW)	750,000	Rubber Workers	159,000
Mine Workers	600,000	Iron Workers	152,000

The nation's ten largest unions now account for 44 per cent of total union membership (vs. 45 per cent in 1956). About 3.3 million women—or 1 out of 7 in the U. S. labor force—belong to unions. About 2.2 million union members are whitecollarites, a drop of 300,000 from the 1956 estimate made by the Bureau of Labor Statistics. Total union membership exceeds 18 million, of which 15 million are in AFL-CIO affiliates, says BLS.

Crucible Steel Stops Hot Rolling at Park Works

Crucible Steel Co. of America will discontinue hot rolling operations at its Park Works (Pittsburgh) by June 1. Some finishing and warehousing ac-

tivities will be continued. Insufficient demand for the miscellaneous alloy steel bar products and hand rolled sheets made at Park Works prompted the shutdown. The mill is "hopeless to modernize," reports Joel Hunter, president. Between 750 and 1000 employees will be laid off. Severance pay will cost the company around $1 million.

Your Idea Can Earn $500 or $1000

Keep a pad and pencil handy while you're reading this and subsequent issues of STEEL. Note the page number of any article or advertisement that will help you accomplish an important personal or company objective. It's the first step toward winning $500 or $1000 in STEEL's Usership Idea of the Month Contest. You'll find details on the contest in the Servicenter, Pages 5 and 6.

Republic Combats Political Ignorance, Indifference

Republic Steel Corp. has embarked on another phase of its long range, employee education program. The new topic: Nonpartisan political education. "We had been appalled by the broad scale political indifference indicated by voting records and surveys," explains H. C. Lumb, vice president. To help correct that, Republic has commissioned 14 top political scientists to prepare filmed lectures. The course will consist of 12, two hour conferences and three workshops. Participation is voluntary. The program will be done on the employee's time—and off the company's premises. Each student will take a do-it-yourself quiz. And he'll be assigned readings from a textbook prepared for the course. Certificates of completion will be issued by the College of William & Mary.

How Many Ideas Can One Man Hatch?

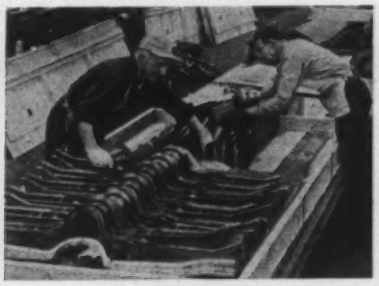
At least 557 in a year. That's the lofty number generated last year by Ross E. Conn, general foreman of the Byproducts & Benzol Dept., Republic Steel Corp. He led the firm's supervisors in idea generation under a work simplification program. Second was S. C. Mitchell with 288 ideas. The top five idea generators submitted 1491. A total of 20,203 ideas were submitted by 551 supervisors; 15,117 (or 75 per cent) were adopted.

Who Uses Professional Recruiters to Find Executives?

The number of companies using them has grown fourfold in five years, reports the Association of Executive Recruiting Consultants, New York. Nearly 30 per cent of the manhunts are made for firms with annual sales of $50 million to $100 million. Companies with sales of $10 million to $50 and

those in the more-than-$100-million category each initiate around 26 per cent of the searches. Firms with sales of less than $10 million account for 17 per cent of the activity. While nearly 60 per cent of the searches are for men in the $25,000-or-under salary range, 28 per cent are in the $25,000 to $50,000 bracket, and 12 per cent are in the $50,000 to $100,000 group.

How to Ship Car Components Overseas



Think you've got packaging problems? Chrysler Corp. crams 24,000 components for 12 complete cars in 14 cartons for shipment overseas. Parts are fed to eight assembly lines (each 100 ft long) for packing. (Picture at right shows one of them.) Oil particles are injected into the boxes which are sealed to prevent corrosion. In the picture at left, deck lids and roofs are packed atop other body parts.

How to Eliminate Two Boxcar Loads of Paperwork

That's the yearly advantage of a new "automated operations control system" at Norair Div., Northrop Corp. J. Grant Macdonnell (picture), treasurer, shows how the volume of paper at right can be converted onto the small amount of punched tape he holds. The system, a marriage of Friden Corp.'s Collectadata and an IBM 704, will handle 30,000 production orders daily, plus around 15,000 other transactions. It'll save more than 425 manhours daily.

$670 Billion for Construction in the Sixties

A whopping $670 billion will be spent in the U. S. for new construction in the next decade, estimates *Architectural Forum*. That sum exceeds the total for the last 35 years. Private nonresidential building will blossom to an annual rate of $15 billion and hit a total of $125 billion during the decade, says the magazine.

Take Off the Blinders, Urges Secretary Mitchell

Since a few men in labor and management can make decisions that affect the public welfare, we must have a guarantee that the decisions will work to

the public good, declares Secretary of Labor James P. Mitchell. It means that "labor and management must take off the blinders that many have worn for 40 years or more," he says. He adds: "Contract terms must represent not the middle ground between two extreme positions but the mutually determined circumstances judged best for the workers, the industry, and the public. That can only be achieved by meetings, held frequently, away from the bargaining table."

Straws in the Wind

Free World consumption of nickel is likely to increase at a rate of more than 25 million lb annually, estimates Horace J. Fraser, president, Falconbridge Nickel Mines Ltd., Toronto . . . 1959 factory sales of transistors soared to 82 million units (valued at $222 million) from 47 million ($113 million worth) in 1958, reports Electronic Industries Association . . . The average American home will have two rooms per person by the end of this decade vs. 1½ today, predicts Gas Appliance Manufacturers Association. It signals a big increase in the market for heating and cooling systems and building products . . . Republic Steel Corp. is producing a new titanium alloy sheet with a high strength to weight ratio that can be fully heat treated and rolled to 0.01 in. in sizes up to 120 in. . . . Blaw-Knox Co. has won a contract from the Interior Department to build a pilot plant for converting sea water to fresh water via a freezing process . . . Bridgeport Brass Co. is considering the production of aluminum pig and ingot through the finished mill product. It will spend $16 million to $18 million equipping a plant at Warren, Ohio, to turn out aluminum sheets, plates, and strip.

Is This Why Highway Program Is Lagging?

"A whopping $303 million in state taxes that should have been used for roads went to other purposes in 1958," reveals the American Petroleum Institute. It says the diverted funds—6.5 per cent of total highway user taxes collected by the states—would have built more than 1000 miles of improved highways (enough to stretch from Milwaukee to Boston).

Metalworking Pulse

Steel: The ingot production rate has been cut a fraction of a point in four of the six weeks since mid-January. **The Business Trend:** Industrial production is showing signs of leveling out on a high plane. Further adjustments in auto and steel production can be expected, but once they have been made, fluctuations in the index will be minor until the spring upturn. **Autos:** First quarter output will fall about 17 per cent shy of original schedules.

• INDUSTRIAL PRODUCTION

Week ended Feb. 20 .... 180†
Year ago 165
Details on Page 67

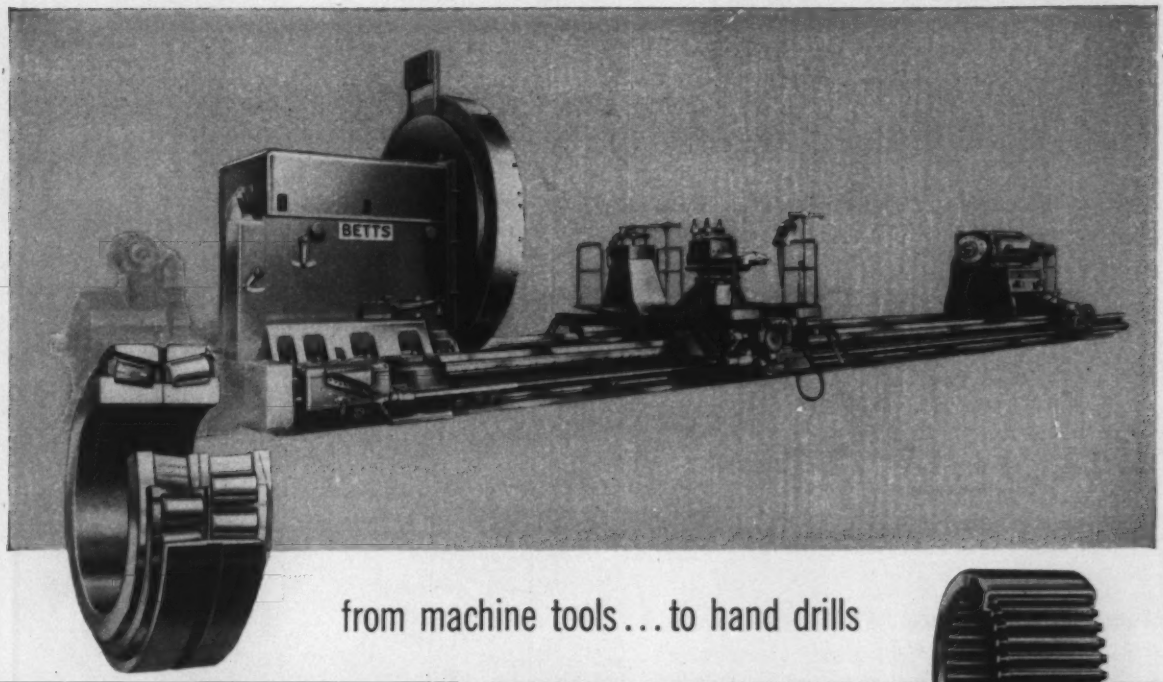
• PASSENGER CAR PRODUCTION

Week ended Feb. 27 .. 154,000*
Year ago 127,783
Details on Page 64

• INGOT PRODUCTION RATE

Week ended Feb. 28 .. 94.0%*
Week ago 93.8%
Details on Page 118

†Preliminary. *Estimated.



from machine tools... to hand drills

Torrington makes the right anti-friction bearing for every basic need!

In a huge lathe, the need may be for a five-foot diameter Torrington Tapered Roller Bearing, precise to a few ten-thousandths of an inch. In a hand drill, it may be for a compact Torrington Needle Bearing, fractions of inches in diameter for light weight and easy handling.

Whatever the requirement, large or small, special or standard, Torrington makes the right type of anti-friction bearing for your specific needs.

You can rely on the broad and diversified experience of Torrington in the design, manufacture and application of anti-friction bearings. Call on your Torrington representative for help in selecting the right anti-friction bearing for your product. **The Torrington Company, Torrington, Conn.—and South Bend 21, Ind.**

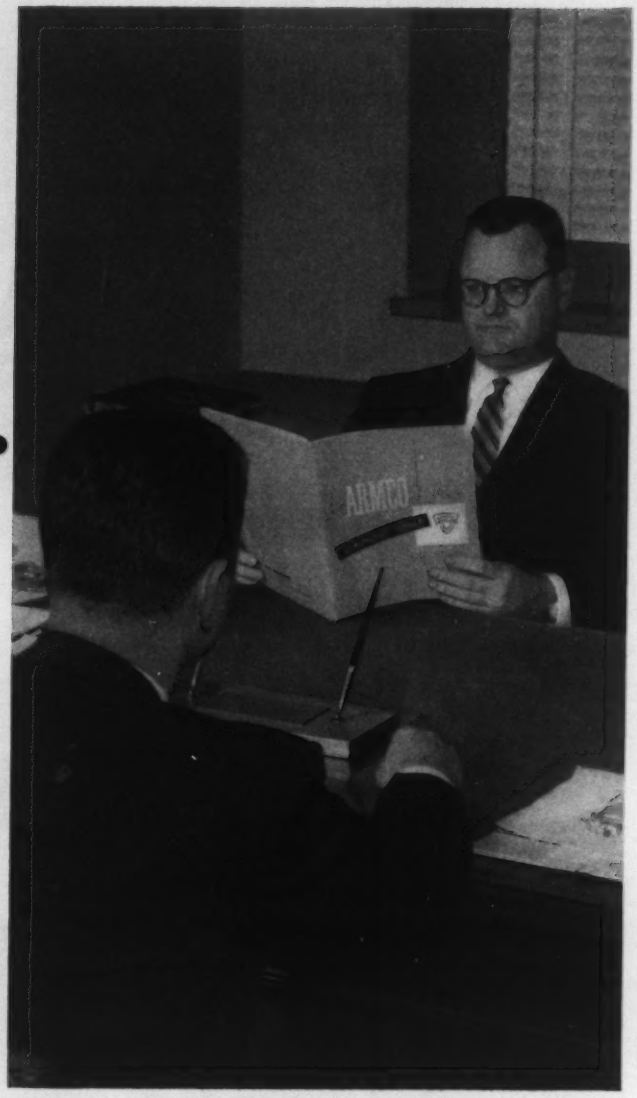
TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

New steels are born at Armco

18-8 STAINLESS Which type do you need?



Armco produces standard 18-8 (Type 302) Stainless Steel, of course. But we also supply a number of variations of this "18-8" analysis to meet your specific requirements.

For example, *Armco 18-8 Si* (Type 302B) contains added silicon for extra resistance to high temperature scaling. *Armco 18-8 FM* (Type 303) and *18-8 FM Se* (Type 303 Se) bars offer improved machinability. *Armco 18-8* (Type 304) minimizes harmful carbide precipitation during welding. And to assure virtual immunity to this condition, Armco developed still another analysis, *18-8 ELC* (Type 304L) with 0.03 per cent max. carbon.

More than 50 other grades

Besides these grades, Armco produces more than 50 additional varieties of stainless steels—from standard chromium and chromium-nickel grades to special precipitation-hardening stainless steels. They are available in sheets, strip, plates, bars, wire, billets, and in a wide range of gages, shapes, sizes, finishes and conditions.

Phone your nearest Armco Sales Office or Armco Stainless Distributor for complete data on any specific stainless grade. For general information about Armco Stainless Steels, just fill in and mail the coupon.

ARMCO STEEL CORPORATION
1240 Curtis Street, Middletown, Ohio
Send me more information on Armco Stainless Steels.

Name _____

Firm _____

Street _____

City _____ Zone _____ State _____

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Profitless Pricing!

Someone once came up with the observation: "You can't make profits without sales."

But he forgot to add the corollary: "You *can* make sales without profits."

Sales without profits are a peculiar and, we think, unnecessary phenomenon of these "fabulous" and "golden" sixties.

Examples of what we mean can be found in practically every area of the metalworking industry, ranging from contract work and capital equipment to small tools and consumer hard goods.

For instance, a company that developed plenty of knowhow making strategic defense equipment suddenly found a powerful, new competitor had decided to get a slice of the business by cutting prices—and profits.

In another case, an important segment of the capital goods industry has been quoting prices so low no one makes over 2 or 3 per cent net profit. A couple of companies are casualties already.

You undoubtedly can name many more examples.

Such profitless pricing may be a hangover from the days when a salesman with a catalog or data sheets and a hungry look could get orders.

He was selling materials and products that were simple and easy to describe. Costs and list prices could be readily comprehended, and he had a fair idea of how far he could go in meeting competition.

Today, material and product specifications are becoming increasingly technical and complex.

And back of the more complicated products is a growing list of functions relating to research, product development, engineering, production, industrial relations, marketing, and promotion.

Thus pricing no longer is a simple matter of adding direct material and labor costs.

It has emerged from an art into a science where "you can't make sales without profits—and stay in business!"

Irwin H. Such

EDITOR-IN-CHIEF

"We break every rule in the book

"We have one of the toughest testing programs in the entire industry. It breaks every safety rule that's ever been invented so that we can find out just how much punishment a grinding wheel can take.

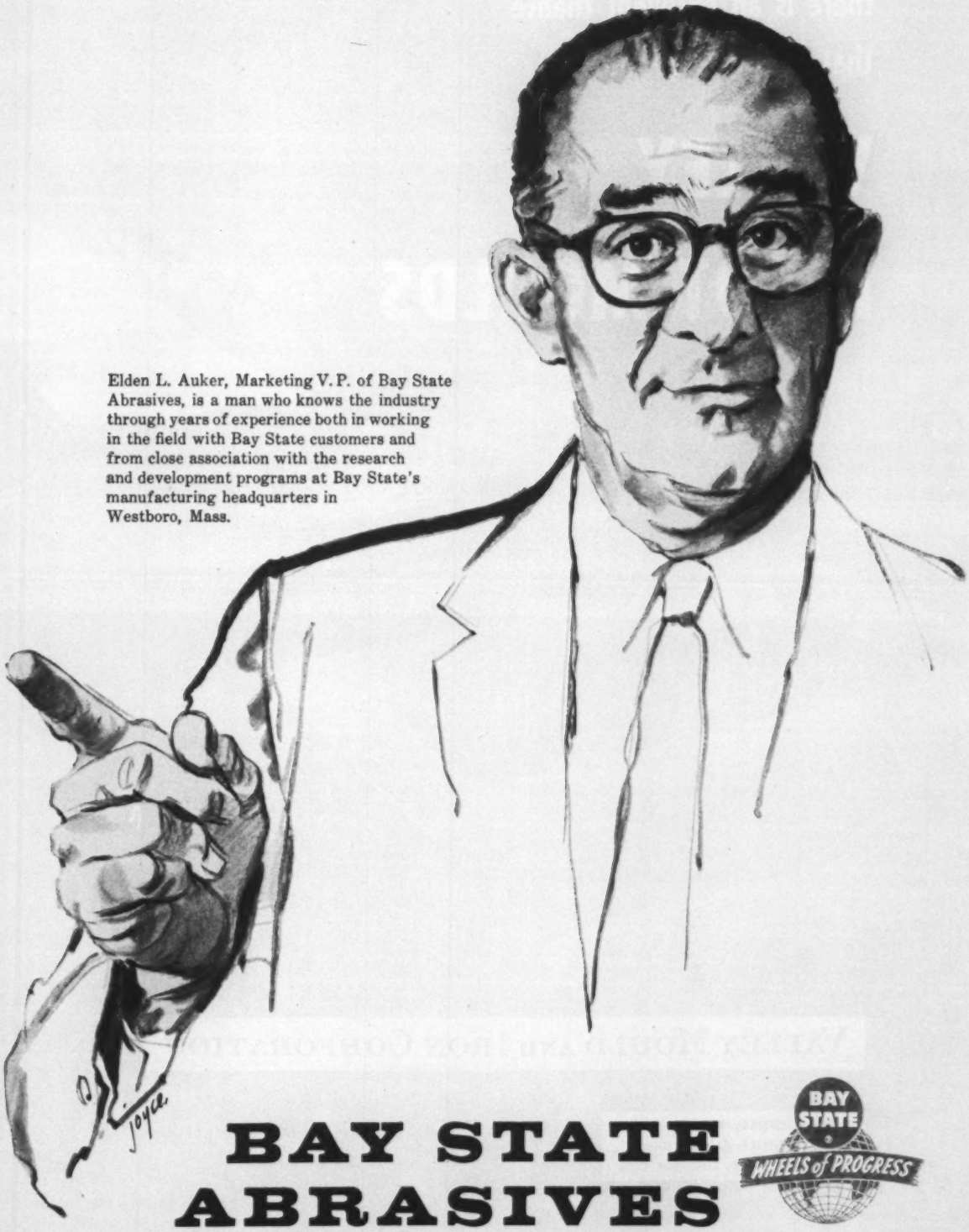
"The test shown here, for example, is for heavy-duty snagging wheels that are used in foundries and steel mills. The wheel under test is locked into a steel drum that's built like a gun turret. Then the wheel is spun at speeds far beyond anything you can get with even the latest production equipment . . . until it finally explodes. Such tests as these have helped us formulate snagging wheels for manufacture with a *safety factor higher than ever before.*

"This, of course, is only one of the more spectacular tests we make on all Bay State wheels. There are many others that probe the ultimate strength factors of every type of wheel under extremes of heat, vibration, tension, torsion and many other variables. And the purpose of these tests goes beyond ordinary standards, too. We are not just trying to produce *acceptable* wheels. We are out to make the best wheels that can be made . . . no matter *what kind* of wheels they may be!

"The record shows that BAY STATE quality also leads to lower grinding costs. You'll find your Bay State distributor or direct representative completely equipped and thoroughly trained to analyze your grinding operations for optimum performance and minimum cost."

"Better grinding at lower cost . . . that is our business."

for YOUR SAFETY . . ."

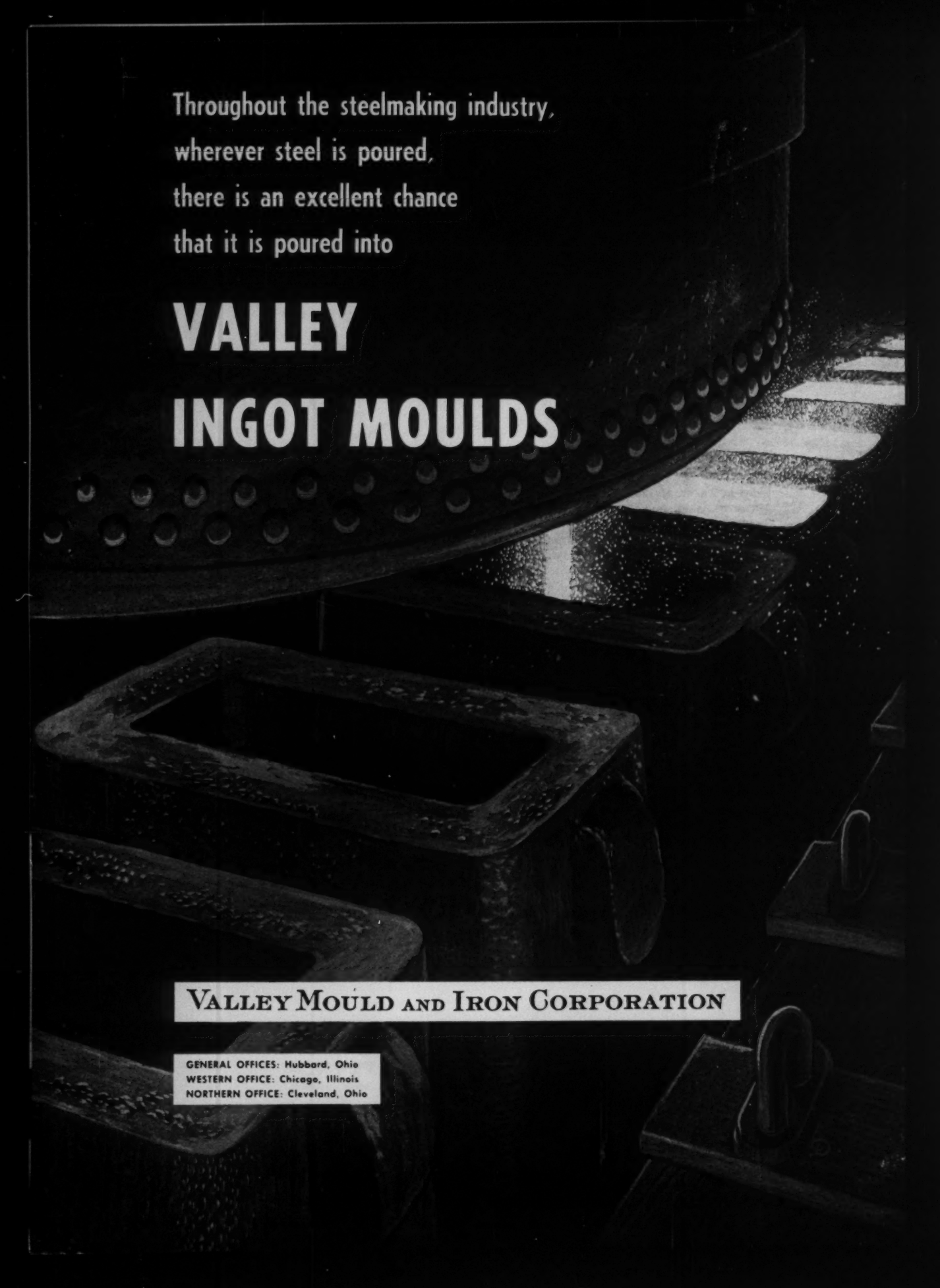


Elden L. Auker, Marketing V.P. of Bay State Abrasives, is a man who knows the industry through years of experience both in working in the field with Bay State customers and from close association with the research and development programs at Bay State's manufacturing headquarters in Westboro, Mass.

BAY STATE ABRASIVES

BAY STATE
WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.


Throughout the steelmaking industry,
wherever steel is poured,
there is an excellent chance
that it is poured into
VALLEY
INGOT MOULDS
VALLEY MOULD AND IRON CORPORATION
GENERAL OFFICES: Hubbard, Ohio
WESTERN OFFICE: Chicago, Illinois
NORTHERN OFFICE: Cleveland, Ohio

Metalworking Sales Ride High . . .

	1st Qtr (Sales compared with 1959's)	2nd Qtr	Outlook for Price Changes
Lift trucks	UP	UP	UP
Cranes, conveyors, other handling equipment	No change	UP	No change
Welding equipment	No change	UP	No change
Heat treating equipment	UP	UP	UP
Power tools	No change	UP	UP
Steel containers	No change	UP	UP
Machine tools	UP	UP	UP
Presses	UP	UP	No change
Heavy industrial equipment	UP	UP	UP

2nd Quarter Holds Key to 1960 Prospects

LIKE THE MAN who discovered his new car would do only 105 mph, instead of 115, metalworkers are reappraising the 1960 business outlook.

Consensus: Initial forecasts were a little high, but it still looks like we'll top last year's performance 5 per cent or more.

STEEL spotchecked a wide cross section of metalworkers last week and found that sales and optimism are still riding high—see chart. Practically every executive looks for further improvement in the second quarter. Also predicted: Prices of many industrial products will rise 3 to 5 per cent in the next six months.

Since for the most part sales are running well ahead of 1959 levels, the question arises: Why the adjustment of yearend forecasts? Three reasons echoed most frequently:

- Auto sales aren't meeting near-boom expectations—but a good year is expected.
- Appliance sales appear to be softening—but over-all volume should equal or top that of 1959.
- Steelmakers are revising their projections downward—but they're predicting the best year in history (see STEEL, Feb. 22, p. 101).

Look at Record—True, auto production cutbacks are underway. It looks like first quarter production will come closer to 1.9 million cars than the 2.25 million originally targeted. But on the plus side, daily dealer deliveries have risen steadily—from a 16,900 rate early in January to 18,700 in the first ten days of February.

Privately, some automakers think sales of 6 million to 6.2 million cars (excluding imports), may be more reasonable than the initial goal of about 7 million. With that volume, sales (including imports) could hit 6.7 million units, second only to the record 7.2 million sales in 1955.

Appliances — When first quarter sales of major appliances are tallied, the figures will be close to 1959 levels. Refrigerators, freezers, and dishwashers are currently scoring gains over last year's sales. Automatic washers, dryers, and water heaters are off the pace.

B. A. Chapman, American Motors Corp. executive vice president and general manager of the Kelvinator Div., predicts an 18 per cent boost in the second quarter. His firm's sales in the first ten days of

February were 29 per cent ahead of those in the same 1959 period.

Hotpoint Div., General Electric Co., now readying a new washer and dryer for a spring sales campaign, reports current sales are running 7 per cent ahead of year ago levels.

A big Eastern radio-television manufacturer reports: His industry's sales from wholesaler to retailer during January ran 16 per cent ahead of last year in televisions and 14 per cent ahead in radios.

• **Industrial Sales Climb** — Many executives admitted that much of the "tempering" of their optimism was based on indicators related to consumer products. In about half the interviews, industrial sales were practically on target, well above 1959's. Here are typical reports on the business and price outlook that executives gave STEEL:

G. E. Seavoy, vice president, Whiting Corp., which makes cranes and foundry and other heavy equipment: "Sales in the first quarter are 14 per cent over those of the previous six months. There's no evidence of (market) softening; in fact, we're optimistic about a strengthening in the engineered products."

C. V. Nass, vice president-general manager, Beardsley & Piper Div., Pettibone Mulliken Corp., foundry equipment maker, says: "Orders in January were less than expected . . . but sales volume in the second quarter should be much better—perhaps 25 per cent—than the first. Reason: Some business has been held up by customer wariness."

John L. Pischke, president, American Monorail Co., reports a terrific upsurge in requests for estimates in the last month. He's predicting a 20 per cent boost in sales (1960 vs. 1959).

A big Eastern construction and steel mill equipment maker's sales are well ahead of last year's, and he sees no softening before midyear. 'We'll settle for a volume equal to 1959's because it was a good one for us," officials comment.

John W. Thornton, vice president-marketing, Joy Mfg. Co., believes the market has a healthier tone this year than last. Its sales are up to forecasts and better than year-ago levels.

Cary Stevenson, vice president of Lindberg Engineering Co., heat treating equipment producer, reports: "Sales in the first quarter are in line with forecasts, about 30 per cent ahead of last year's. We expect the second quarter to be the same. Equipment prices have gone up about 5 per cent in the last three months because of cost hikes."

• **Welding Equipment** — Sales in this industry are running close to 1959 levels, below earlier predictions. Most firms expect second quarter volume to be up. The price outlook is mixed, with some downward as well as upward revisions indicated.

Stanat Mfg. Co. Inc.'s rolling mill and slitting equipment sales are even with last year's and bookings this month have picked up.

• **Material Handling** — Lift truck, conveyor, and other handling equipment firms show sales increases over year-ago levels, and the outlook for the second quarter is for additional improvement. Some price revisions are hinted.

Officials at Baker Industrial Truck Div., Otis Elevator Co., say January business was much better than anticipated, but there has been a softening in February.

Rapids-Standard Co. Inc. says its sales should run about 8 per cent ahead of 1959's. "In the last week or so, quotes have been picking up substantially."

• **Press Sales Hold**—Melvin Verson, vice president of Verson Allsteel Press Co., echoes the feelings of most pressmakers: "Sales are ahead of last year's, and slightly ahead of earlier forecasts. We see no change in the trend at the moment."

An Eastern pressmaker says orders from his standard lines have slowed down, but special equipment sales are going well. He looks for a rise in the second quarter, adding: "Competition is rough; there's some price cutting."

A power tool producer, Rockwell Mfg. Co., comments that its business was dull at the start of the year but has been improving steadily. It looks for strong improvement in the second quarter.

RUNNER FOR FT. PECK, MONT., DAM is welded at the shops of Allis-Chalmers Mfg. Co., West Allis, Wis. It's for one of two 63,500 hp, 128.6 rpm, 170 ft head hydraulic turbines being installed in the project

Big Pipe Order Placed

A $25 million pipe order has been awarded to A. O. Smith Corp., Milwaukee, by Michigan Wisconsin Pipe Line Co., Detroit. It calls for more than 600 miles of pipe, requiring an estimated 140,000 tons of steel plate. The pipe will be used for enlargement of a natural gas line from Oklahoma to Michigan and Wisconsin.

Pittsburgh Steel Boosts Ore Source Ownership

THREE MOVES have been made by Pittsburgh Steel Co. to develop the largest raw material program in the company's history and move it closer to an integrated operation. Mines in which Pittsburgh Steel is sole or part owner will soon be supplying about 70 per cent of the firm's annual iron ore requirements compared with 40 per cent in 1959.

• **Bennett Mining**—By purchasing the two-ninths interest in Bennett Mining Co., Keewatin, Minn., held by Interlake Iron Corp., Cleveland, Pittsburgh Steel becomes sole owner of the open pit Mesabi range operation. The purchase will give the company up to 500,000 tons of ore annually over the life of the property. A four year old beneficiation plant, valued at $1 million, is included in the acquisition.

Last year, Pittsburgh Steel bought the five-ninths of Bennett held by Bethlehem Steel Corp., Bethlehem, Pa., and Youngstown Sheet & Tube Co., Youngstown. Pickands Mather & Co., Cleveland, will continue to operate the facility.

• **Lake Mining** — Pittsburgh Steel has also acquired the 25 per cent interest in Lake Mining Co., Biwabik, Minn., held by Bethlehem Steel and Youngstown Sheet & Tube. Other owners are Interlake Iron, Inland Steel Co., Chicago, and Steel Co. of Canada Ltd., Hamilton, Ont. The move will add 250,000 tons to Pittsburgh Steel's annual ore supply through 1965. Lake Mining's total yearly capacity is 1 million tons. Pickands Mather & Co. operates the property.

• **Wabush Iron**—The most significant part of its iron program, says Pittsburgh Steel, is its entry into Wabush Iron Co. It joins Inland Steel, Interlake Iron, Pickands Mather, Stelco, and Youngstown Sheet & Tube. Wabush has begun development of a 5 sq mi ore deposit near Wabush Lake, on the western border of Labrador, 200 miles north of Seven Islands, Que. The region has proved reserves of more than 1 billion tons of low grade ore readily concentratable into high iron content ore. Development of the entire project may eventually require $200 million.

A pilot plant, which will be used to test concentrating methods, will begin operation about Mar. 1 and is expected to turn out 50,000 tons of ore by the end of the year. From this, the ultimate size and production of the full scale plant will be determined. Initial production schedules call for an annual output of 4 million to 5 million tons, of which Pittsburgh Steel's share is estimated at 400,000 to 500,000 tons.

Ore will be transported from the plant by rail to the St. Lawrence River near Seven Islands. But before regular production can begin, large scale mining, crushing, and concentrating equipment must be built at the site, railroad facilities completed, and a St. Lawrence River storage area and loading dock constructed.

• **New Sinter Plant** — Pittsburgh Steel does not have a sintering plant capable of handling the ore tonnages it will receive from Wabush. The company is studying various designs and possible locations for such a facility.

War Plant Up for Sale

The Gary (Ind.) armor plate plant has been put on the block after a spotty civilian career.

Some $3 million worth of the plant's hot slab rolling mill equipment has been purchased for liquidation by M. S. Kaplan Co., Chicago.

The mill was built during World War II for the Army by U. S. Steel Corp. on company property. It was operated by Carnegie-Illinois Steel Corp. The facility (original cost, $19 million) had a capacity of 335,000 net tons of sheared plates.

After the war, the government purchased the land (54.4 acres) and in 1956 sold the facility to American Auto Part Co., Kansas City, Mo., for $3,620,000. The building was used as a warehouse.

In 1958, St. Lawrence Steel Corp., New York, formed a company to purchase the property and had plans to reopen the mill. Financing was arranged by Walter E. Heller & Co., Chicago.

Because the company failed to complete its organization, Heller sold the plant and equipment for liquidation. The real estate was not involved in the transaction.

Equipment being offered for sale includes: A Morgan 60 in. universal plate mill, a McKay 90 in. plate leveler, a straightening and flattening press, conveyor furnaces, plate cleaners, and electromagnets.

UAW Whets '61 Ax

WALTER REUTHER's United Autoworkers will be seeking a new form of yearend profit sharing in 1961 contract negotiations. The UAW proposal: If a company shows a net profit at the end of the year, a bonus increase in the form of extra wages or fringe benefits would be provided in addition to a guaranteed basic increase in wages and benefits.

Although that "Reutherism" is similar to the profit sharing plan argued during 1958 negotiations, the UAW president says it has this difference: "The share of management, workers, and stockholders would be determined after all the economic facts are in instead of trying to guess in a contract what the workers' fair share might be two or three years later."

It's likely that the postdated proposal will take on more definite shape before it's presented to bargainers next year. As to its chances, Mr. Reuther asserts: "They (the companies) said 'no' to pensions, SUB, severance pay, and practically everything else—the first time we asked for them. The plain fact is that we are determined to find some way for workers to share more fully in advancing technology." The UAW has lost 200,000 members in the last five years, mostly due to technological advances. Membership now is around 1.3 million.

Status Symbols Termed Legitimate Incentives

CORPORATIONS that give Cadillacs, keys to the washroom, and other status symbols to their executives are following sound business strategy, maintains George S. Odiorne, director, University of Michigan Bureau of Industrial Relations.

"The justification for such a scheme must be based on performance and unselfish service by executives qualifying for higher status," he emphasizes, adding: There should be standards of performance . . . and adequate opportunity for promising personnel to move quickly through the ranks at the expense of the mere time server.

"With such a system fully developed and the price to be paid fully explained, there may be less concern . . . about the breaking down of society into more sharply defined status systems," continues Mr. Odiorne.

He claims status seeking in business creates little danger of producing a social elite. While businessmen may enjoy a status based on power over others, the U. S. has at least two other hierarchies, he explains. One is based on intellect, the other on taste.

"Highbrows in our society, from the standpoint of taste, aren't the highest paid," concludes Mr. Odiorne. "Machine operators and secretaries may have finer tastes, more discrimination in the arts, and read more cultural books than the president of their corporation. Permanent elites which combine status, intellect, and taste, as did the landed aristocracy of old Europe, are getting farther and farther away."

Mr. Odiorne expressed his views at the recent midwinter personnel conference of the American Management Association in Chicago.

• **Enter STEEL's $1000 Usership contest—See Pages 5 and 6.**

Industrial relations man suggests . . .

Companies can use these incentives for potential executives:

1. Raise executive pay

There has been a great leveling off in salary differential. The time is ripe to reward a few people at the top and pay everyone else less in proportion to his rank.

2. More elegant offices

If people in business were more clearly identified by the luxury of their offices, those of lower status, if properly indoctrinated, would strive harder to do a better job and reach the higher positions.

3. More clubs for the upper crust

Club memberships of ascending importance for the various ranks would serve to spell out who is who and to what level he belongs.

4. Company financing of upper crust housing

Companies could sponsor financial backing for various levels of housing, retaining the most expensive architects for upper level executives and some of the lesser ones for lower ranks.

An executive must pay the price for moving into the higher status groups:

1. He must sacrifice his leisure time

The top executive can have all the "good things of life" if he tacitly agrees that he'll not take the time to enjoy them, as do those of lesser responsibility.

2. He must sacrifice the life of the mind

He'll find little time to read anything other than business magazines and occasional business books.

3. He must set aside cultural and aesthetic pursuits

Such things are for the relaxed mind.

4. He must not expect a normal family life

Because he's committed to the status hunt scramble, his family life will be less complete.

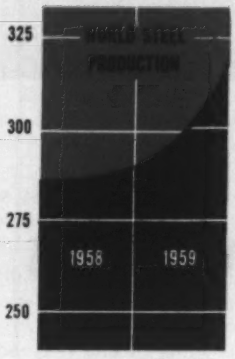
5. He must live a rootless existence

He's a transient who moves up by moving around.

World Steel Output Tops 317 Million Tons in '59 . . . Latins Sign Free Trade Pact . . . Red Trade Rises

World Steel Production Climbs to Record

(Millions of net tons for ingots and castings)



Country	1959	1958
U. S.	93.4	85.3
USSR	66.0	60.5
West Germany	32.4	28.9
United Kingdom	22.6	21.9
Japan	18.3	13.4
France	16.7	16.1
Benelux*	13.0	11.9
Italy	7.4	6.9
Canada	5.9	4.3
Other	42.0	40.0

*Belgium, Netherlands, Luxembourg.
Estimated. Excludes Communist China and North Korea.
Source: Department of Commerce.

ECSC Sets Steel and Ore Records

The European Coal & Steel Community set three records in 1959:

- Output of steel for ingots (see table above) reached 69.5 million tons. That's 8.9 per cent greater than the 1958 level of 63.8 million tons and 5.5 per cent above the previous high of 65.8 million tons in 1957.
- Orders for rolled steel products reached 55.3 million tons, 34 per cent more than the 1958 volume of 41.3 million tons and 19 per cent higher than the previous record set in 1956.
- Iron ore production was 97.1 million tons compared with 95.8 million tons in 1958 and 96.2 million tons in 1957.

Reds Snare More Free World Trade

Almost 30 per cent of all Sino-Soviet bloc foreign trade is with nonbloc countries, reveals the Department of Commerce. Between 1948 and 1953, the percentage declined from 59 to 20. Since 1953, the year Stalin died, the trend has reversed.

In the 1948-58 period, the Sino-Soviet bloc's percentage of world trade rose from 6 to 11 per cent, which is approximately the prewar level. During the 11 year span, intrabloc trade jumped nearly sixfold, from $2.8 billion to $18 billion, while trade with nonbloc nations increased 70 per cent, from $4 billion to $6.9 billion.

Over one-third of Sino-Soviet trade is conducted by the U.S.S.R. Mainland China's share is about 18 to 19 per cent. East Germany and Czechoslovakia are also important factors.

South Americans Form Common Market

Seven Latin American nations—Argentina, Brazil, Chile, Mexico, Peru, Paraguay, and Uruguay—have signed an agreement to gradually eliminate tariffs and other customs barriers over a 12 year period. Concessions on specific goods, to be negotiated annually, will be on a reciprocal basis. Tariff reductions are expected to run about 8 per cent a year.

The pact sets up an economically integrated unit similar to the European free trade areas. However, no great effects are immediately foreseen because ratification will take several months. After that, reductions must be negotiated and exchange problems worked out.

It is hoped that other Latin countries will eventually join the group. Observers from Bolivia, Colombia, Ecuador, and Venezuela attended the talks in Montevideo, Uruguay.

Latin Tractor Market Looks Bright

Although European competition is stiffening, U. S. producers of farm machinery and equipment have a good potential market in South America, concludes the Department of Commerce after a ten country survey. Labor is still cheap, but the transition to mechanization is forging ahead with agricultural development.

Foreign competition, primarily from English, German, and Swedish manufacturers, appears toughest in Bolivia, Brazil, Paraguay, Peru, and Surinam. Lower costs and more favorable credit terms are key selling points. Demand for American machinery is strongest in British Guiana, Chile, and Colombia.

The outlook for Argentina and Uruguay seems the least favorable. Import volume to Argentina is likely to be confined to repair parts since domestic production is encouraged. However, as in most Latin nations, domestic tractor production is still in the planning stage.

Japanese Show Interest in Canadian Ore

British Columbian iron ore has found a market in Japan. Exports are running about $7 million annually. Development of new properties, all on Vancouver Island, combined with Japanese research on the low grade Canadian ores, may double or even triple that figure within the next few years, predict observers.

Porcelain Enamel's Markets

	Per Cent of 1959 Sales
Ranges, cooking equipment, heating equipment	29%
Refrigerators and freezers	14
Home laundry equipment and dishwashers	16
Water heaters	5
Plumbing equipment (lavatories, tubs, etc.)	12
Architectural	9
Signs	2
Lighting fixtures	1
Hospital ware and cooking utensils	1
Other	11
	100

Source: Porcelain Enamel Institute.

Ingram-Richardson Mfg. Co.

Enamelers Seek Gains in Old, New Areas

NEW USES and normal expansion in the major household appliance field are expected to boost porcelain enameling sales to possibly $450 million this year. Percentagewise, a gain of 4 to 6 points is expected compared with 1959.

• Among new uses turning up are protective coatings in industrial applications, decorative coatings, and electroluminescent applications.

Protective coatings are regarded as of extreme importance by William H. Lowry, executive vice president, Vitreous Steel Products Co., Cleveland. In that category are automobile exhaust systems. Porcelain enameled mufflers are being used in trucks and buses. Other uses are being found where problems of corrosion must be overcome.

In the field of decorative coatings, Hugh McE. Patton, executive vice president, Ingram-Richardson Mfg. Co., Beaver Falls, Pa., reports good response to the introduction of enameled expanded metals.

Another interesting development reported: Several metals (such as stainless steel, aluminum, and aluminized steel) once considered sufficient in themselves, are now being enameled to achieve color.

Electroluminescence is only one of the electrical applications. Various other industrial applications are being found where electrical properties are important.

• Fastest growing applications are in architecture, general enameling, home laundry equipment, and hot water heaters—in that order.

While still leading the list, architectural uses are leveling off. Continued growth is expected for enameled sheets for curtain walls, but competition from other materials in the building field is expected to slow over-all gains.

• Competitive threats include vinyl coatings on metals.

L. L. Burke, vice president, Design & Mfg. Corp., Connersville, Ind., is one of those who is concerned about competition from the vinyl plastics.

Other competitive threats mentioned: Aluminized steel, paint, high temperature organics, tile, glass block, brick, and stone.

• Technological improvements may give porcelain a needed lift.

Prominent are efforts in the direction of lower temperature porcelain enamels and porcelain enamel cover coats applied direct to lower cost steel, instead of premium priced enameling sheets. Both are still in the development stages.

Currently available are at least three, one coat low temperature enamels. Most recent development in this category is that of Ferro Corp., Cleveland. Suitable for certain applications, the process eliminates the traditional blue ground coat and can be applied to nonpremium, cold rolled steel as well as enameling stock (see STEEL, July 6, 1959, p. 76).

The enamelers' choice of steels suitable for single cover coat was widened earlier this year when Armco Steel Corp., Middletown, Ohio, announced a new kind of iron that will take one coat (white or color) instead of the usual two coats of enamel. The new metal needs no ground coat.

Better weather resistance and greater durability for products are being achieved in the industry. Also some steel architectural panels are being made with enamel exteriors and vinyl coated interiors.

What to Do When Imports Hurt

Atlantic Steel Co. retrenches, concentrates sales and service efforts where there's the best chance to win. Results: Record sales and earnings

ATLANTIC Steel Co., Atlanta, has gained ground—at least temporarily—in a fight to keep its markets from being gobbled up by imports.

The company sold more and earned more in 1959 than ever before. Net sales were $29,433,860; net earnings were $1,349,526.

But the company recognizes that its back is still against the wall in the steel import battle.

• **In Vulnerable Area** — Atlantic Steel found it had a geographic disadvantage. The area was being flooded with imports of wire products in which it specialized. The company's steel output dropped 44 per cent and its employment fell 30 per cent from 1953 to the beginning of 1959. About half the employment decline stemmed from foreign competition. The rest came from abandonment of certain fabricating operations and the installation of equipment more automatic than that which it replaced.

Gains in sales and earnings in 1959 came from hard work, sacrifices, and some good fortune.

• The hard work encompassed improved service to customers and concentration on products least hit by low wage foreign competition.

• The sacrifices include an austerity program, with reductions in manager salaries, and job consolidations. The company and the union also worked together to achieve production efficiencies. Despite increased employment costs per manhour, the company was able to cut its average cost per ton of steel.

• The good fortune was the operation of the company during the nationwide steel strike in 1959. (The company had an earlier work stoppage—from Oct. 31, 1958, to Feb. 10, 1959.)

Taking advantage of those circumstances, Atlantic Steel pushed ingot production in 1959 to 217,744 net tons (vs. 1958's 146,643 tons). Steel shipments climbed to 170,288 net tons (vs. 129,046 tons in 1958).

Howard B. Johnson, Atlantic Steel Co. president, leads his company in competitive battle against steel imports

• **Giving Up Markets**—Despite its valiant fight for markets, the company has had to make some concessions to steel imports. It has given up most of its markets for woven wire fencing and barbed wire. Sixty per cent of its field fence machines have been dismantled because foreignmade fence has virtually taken over the domestic market, Howard B. Johnson, Atlantic Steel's president, reports. He also expects a portion of the company's barbed wire machines to be scrapped soon.

• **Aim: Better Service**—Plant space gained by dismantling the machinery will be used for increasing inventories of finished steel products so that the company can supply customers' wants fully and promptly.

Atlantic Steel also dismantled its three open hearth steelmaking furnaces in 1959. They had not been used since April, 1957, and the company considered them obsolete. Two modern electric furnaces make the company's steel. Scrapping of the open hearths reduced the company's rated ingot capacity from 400,000 net tons annually to 325,000 tons.

• **Not Alone**—Atlantic Steel is not the only company caught in the import squeeze. Other steelmakers, particularly wire producers, have felt the pressure. Pittsburgh Steel Co., Pittsburgh, announced last summer that it was discontinuing its oldest product line—merchant wire products (see STEEL, May 18, 1959, p. 148). It gave foreign competition as one of the prime reasons for its action.

• **Updating Facilities**—In fighting to be competitive, Atlantic Steel will install modern equipment to replace badly worn or obsolete facilities. The capital expenditure program which it is now planning will be financed from earnings. It retained more earnings in 1959 than in any other year of the 1950s. The 1959 amount was $1,065,629 compared with only $132,378 in 1958 and $24,093 in 1957.

The company's expenditures for capital equipment in 1959 were $225,585 compared with $97,664 in 1958.

In another step to help itself, Atlantic Steel established (in 1959) graduate fellowships at the Georgia Institute of Technology and the University of Georgia for study in fields related to its problems.

Ideas Pay Big Dividend

Ideas for work simplification submitted by manufacturing supervisors and employees saved more than a million dollars last year at Maytag Co., Newton, Iowa. It was the third straight year the company has realized a million dollar dividend on ideas.

J. F. Biggane, manager of industrial engineering, reports that of the 1286 ideas submitted by supervisors 558 were used. Unit employees turned in 2850 ideas; 384 were accepted.

OCDM Offers Toolbuilders A Program . . .

1. To survey industry's re-equipment plans.
2. To study methods of increasing tool exports.
3. To find out if foreign suppliers manipulate U. S. markets.
4. To advise tool owning government agencies on equipment modernization.
5. To seek Congressional support for loan guarantees by Small Business Administration.

OFFICE OF Civil & Defense Mobilization has at last responded to the National Machine Tool Builders' Association "white paper" of last year (STEEL, Sept. 18, 1959, p. 84).

The association's statement made several points about the health of the domestic machine tool industry. Among them: 1. USSR and other foreign tool industries are growing more rapidly than ours. 2. Imports of tools are hurting domestic makers. 3. Exports of U. S. tools are on the decline. 4. To counteract those trends, more U. S. tool firms are building plants abroad, thereby diluting the domestic mobilization base.

It may be safely stated that the NMTBA presented its story to OCDM as a preliminary to the filing of a request for relief under the Trade Agreements Act. A sick machine tool industry would be a threat to the national security. That the White House is aware of the problem is indicated by recent Treasury Department action toward giving industry a better break on depreciation allowances (STEEL, Feb. 22, p. 33).

Why Doesn't Industry Re-equip Faster?

One of the problems central to the toolbuilders' case, reports a high OCDM official, is the fact that much of industry is not buying modernized equipment as fast as it should. One surprising situation: Many firms have not taken advantage of certain liberalized depreciation methods made available recently.

The big item in the program that OCDM has offered the toolbuilders is "a comprehensive survey" of industry to determine why metalworking plants do not re-equip faster. Some studies have shown that more than 75 per cent of the nation's tools are obsolete. The OCDM study will be conducted by the Commerce Department, jointly financed by the Business & Defense Services Administration, and Office of Civil & Defense Mobilization. A steering committee to direct the study will include those agencies, plus the Budget Bureau, Treasury, Defense Department, and the Small Business Administration. Much of the work will be done by the Census Bureau.

How Do You Increase Tool Exports?

The second point in OCDM's program is to study means by which exports of all metalworking firms may be increased. P. A. Bennett, acting director, BDSA Metalworking Equipment Division, reports an export trade promotion conference for the machine toolbuilders is scheduled for Mar. 8.

Purpose of the meeting is "to solicit advice from industry as to specific moves the government might undertake to give maximum assistance in increasing the sale of American goods abroad."

Are Foreign Suppliers Dumping?

Many toolbuilders have expressed worry about dumping and cream skimming practices of foreign tool suppliers. OCDM feels it is not yet a serious situation, but will study the problem.

Dumping is, of course, illegal. But a foreign supplier who steps into U. S. markets and grabs the bread and butter items without trying to provide some of the more technologically refined items cannot be touched by the law.

OCDM is almost convinced that price is not the main reason for the incursions of foreign tools into U. S. markets. Rather, the tools themselves often swing the American buyer to the foreign product.

Government Tools Must Be Modernized

Among those close to government tool owning agencies it is common knowledge that funds authorized for modernization are often diverted to other uses. OCDM's request to the Budget Bureau to inform the agencies of the advantages of modernization could amount to an order to keep tools up to date.

A forthcoming Budget circular could establish standards for government re-equipment programs and force the agencies to use the funds allotted to them for that purpose.

Treasury Interest

OCDM's request to SBA for legislation to guarantee loans for re-equipping is, perhaps, unnecessary. Say SBA officials, they regard their loan programs as equally available to facilities or equipment purchases.

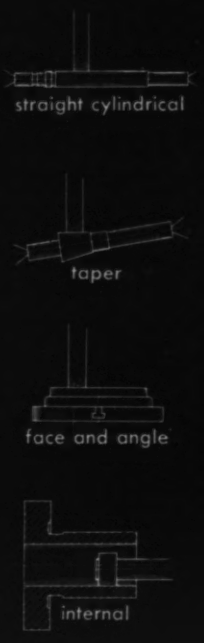
Significance of the OCDM request may lie in the continued representation of the Treasury on the task group which prepared the program. Treasury will participate in the depreciation survey too. In effect, says one source, Treasury is under White House orders to do everything it can this year to help industry—at least up to the point where revenue might be lost.

Low cost grinding of small parts... Landis Grindwell general purpose cylindrical grinder

for:
manufacturing
maintenance
toolrooms
training

here's how you save:
low first cost
quick change of setup
high precision
simplified maintenance

typical grinding operations



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The "custom" approach to oil seal manufacture, pioneered by IPC, has resulted in some real off beat products.

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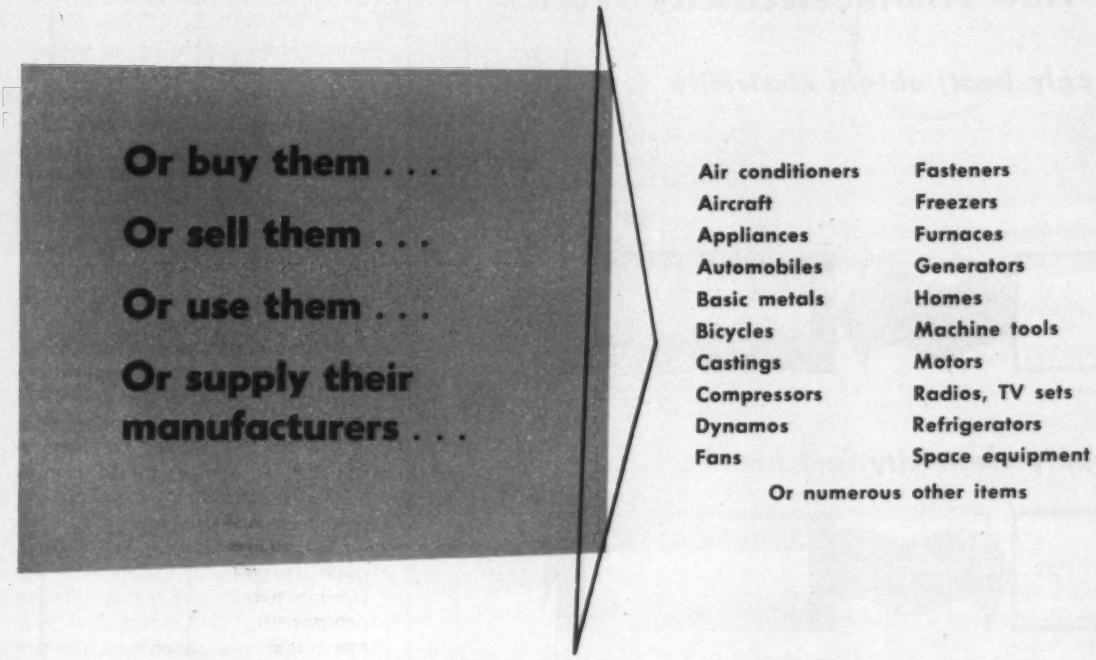


Get Set for the Shock of Thermoelectricity

It'll obsolete some present products, open new markets, shift others. It'll challenge the designer's imagination. It'll demand new production processes, new materials, new technology. It'll pave the way for new standards of reliability and efficiency. Metalworking will benefit

"IN 10 TO 15 YEARS, more than half of all major household appliances will employ thermoelectric devices."

That prediction signals the vast and significant changes thermoelectricity will impose upon metalworking. It comes from Samuel Shapiro, president, Materials Electronic Products Inc., Trenton, N. J.

More than 100 companies—many of them blue chip metalworkers—are pouring huge sums into thermoelectric research and development. They're shooting for huge shares of three major metalworking markets: 1. Heating. 2. Cooling. 3. Power generation.

Look at the products mentioned above. Thermoelectricity can—and eventually will—be applied to all of them, and many more.

It means metalworking must prepare for tremendous changes in markets, in production processes, in design, in standards of reliability and efficiency.

What It Is

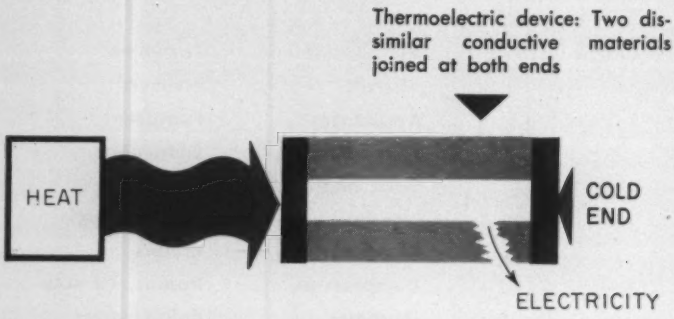
Thermoelectricity enables you to directly convert heat into electricity or electricity into heat with no intermediate moving parts. By reversing the electron flow, you get cooling directly from electricity.

● **Example**—Step into the office of Walter C. Shaw, chief of the advanced product planning section at United Aircraft Corp.'s Hamilton Standard Div., Windsor Locks, Conn. But don't park your cigaret in the shiny dish on his desk. Reason: That "ash tray" is really an experimental solar generator. A small concave dish with a highly polished surface, it has in its exact center a small shaft capped with a tiny metal ball. Placed at the proper angle in direct sunlight, the curved surfaces of the dish focus the sun's rays on the ball. It creates temperatures of thousands of degrees Fahrenheit.

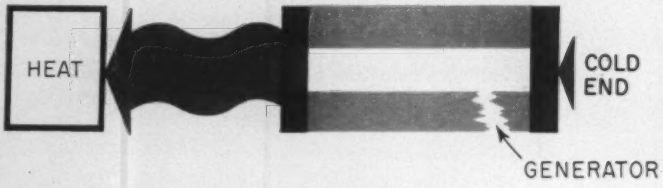
Mr. Shaw explains that such heat concentrations can be focused on one end of a metal bar whose other end is refrigerated. The tremendous difference in temperature will set up a flow of electrons comparable to that created by an electrical generator. A variation of the same principle has resulted in Hamilton Standard's development of a small refrigerator which has no moving parts. The cooling effect is obtained by applying electrical power to two bars of dissimilar material

How Thermoelectricity Works

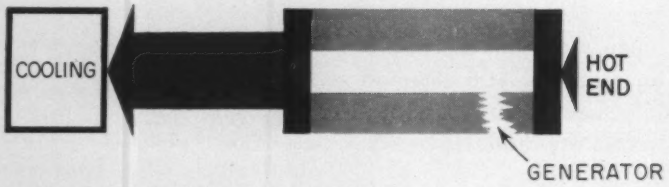
Apply heat; obtain electricity . . .



Apply electricity; get heat . . .



Reverse the electron flow; get a cooling effect . . .



All with no moving parts!

coupled at their ends. One end of the combination becomes warm while the other becomes cool. Mr. Shaw says the thermoelectric refrigerator was highly successful in an impromptu test—a bottle of champagne was cooled to the precise pouring temperature.

Where It's Used Now

Some thermoelectric products are already being made. Most of them are for specialized cooling applications in which compactness and reliability, or ruggedness, simplicity, and high temperature operation are more important than efficiency. Other applications: Small power generators for satellites and other equally specialized jobs.

Westinghouse Electric Corp., Pittsburgh, reports these current applications: 1. Power generation (1 to 100 watts can be generated with an efficiency of 5 to 10 per cent vs. about 30 per cent for conventional coal or oil systems) in satellites, where solar heat is converted to electricity. 2. Power generation at remote locations. (Another source tells of powering a small radio by using a thermoelectric device to obtain electricity from the heat given off by burning animal dung.) 3. Power generation using radioisotopes. 4. To cool transistors and other heat sensitive devices. 5. To cool blood during surgery. 6. To refrigerate small quantities of food. 7. To provide precise temperature control in small areas (up to 3 or 4 cu ft) for laboratory and industrial needs.

General Instrument Corp., Newark, N. J., says these applications are possible with present materials: 1. Power generation at Arctic weather stations. 2. Power for communications equipment in the tropics. 3. Air conditioning of underwater or outer space vehicles.

Whirlpool Corp., St. Joseph, Mich., says these applications are feasible today: 1. Cooling infrared detector cells. 2. Cooling food storage rooms in submarines where a minimum noise level is essential.

Pacific Fire Extinguisher Co., San Francisco, has developed a monitored fire protection system using a detector head containing a thermoelectric generator element. The element is made by Minnesota Mining & Mfg. Co., St. Paul.

Baso Inc., Milwaukee, uses a similar conductor material, made by 3M, in a thermoelectric generator to power gas appliance control systems. Elston Co., Minneapolis, uses the Baso system in heaters it builds for truck cabs.

"But present applications only scratch the surface of the ultimate potential," points out Dr. R. W. Fritts of 3M.

What's Being Developed

You can expect to see at least five times as many thermoelectric devices on the market two years from now as there are at present. Here are some examples of what is coming:

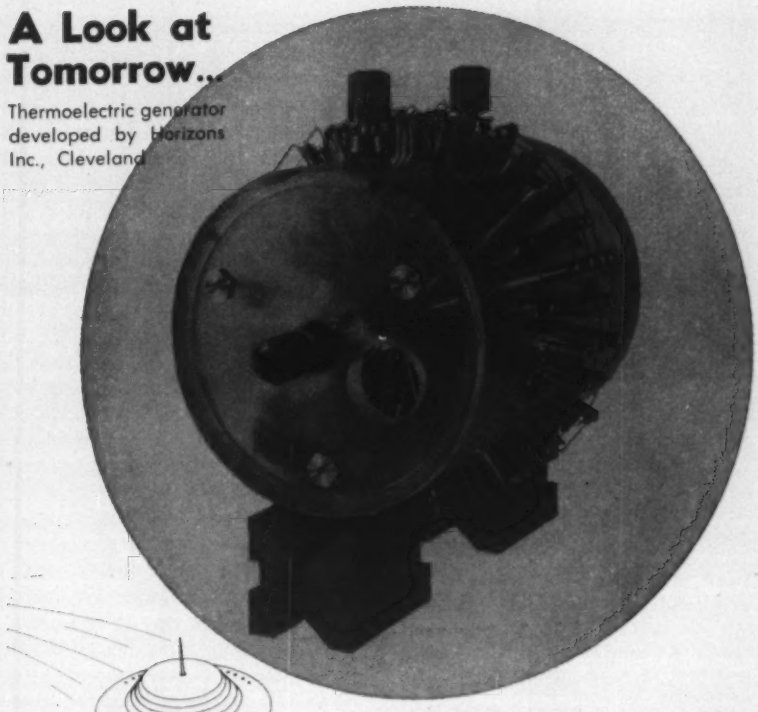
Lone Star Gas Co., Dallas, is making a ceiling bathroom heater.

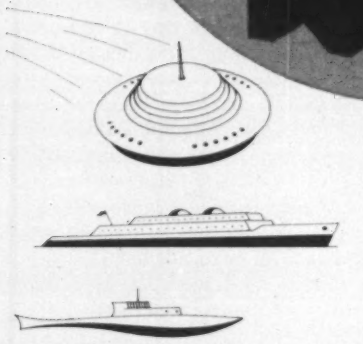
Northern Illinois Gas Co. and 3M have developed an experimental device to control pipeline corrosion.

Line Material Industries, Milwaukee, has developed a lamp em-

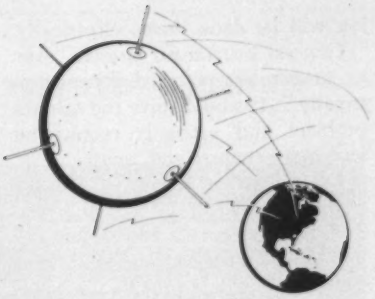
A Look at Tomorrow...

Thermoelectric generator developed by Horizons Inc., Cleveland





In the atomic submarine of tomorrow, thermoelectricity might handle air conditioning, food storage, and communications. On the ship, it could provide heating, air conditioning, refrigeration, freezing, dehumidification. In the space vehicle, thermoelectricity might give tomorrow's commuter air conditioning, radio, and other auxiliary equipment



Thermoelectric generator in a satellite could convert heat from the sun into electricity to power a radio transmitter

A thermoelectric device could be a central power source for an auto that operates with only tiny motors on each wheel. Advantages: No exhaust problem, no noise, design flexibility, great reliability. The bicycle, too, would be powered thermoelectrically

ploying a thermoelectric heat pump. The firm says that in a pilot study it boosted light output 72 per cent.

Hamilton Standard has a solar power supply unit for space applications under test. Outlook: It promises to "be a revolutionary unit for low power applications."

Perkin-Elmer Corp., Norwalk, Conn., is working on thermoelectric components for analytical instruments for laboratories.

Battelle Memorial Institute, Columbus, Ohio, says you can expect to see small cooling and generating specialty items on the market in the next two years.

The federal government also has an active interest in thermoelectricity. The Navy's Bureau of Ships is probably the focal point for armed services information on progress and development in the field.

The Navy is studying complete shipboard installations, including air conditioning and heating plants, refrigeration and freezing equipment, and dehumidifiers.

Future Is Fabulous

"Let your imagination run wild. Most of the applications you dream up will one day be possible." That's what one source told STEEL when asked about the ultimate potential of thermoelectricity.

While most firms in the field aren't that optimistic, interest is at a fever pitch. If only half the applications being considered are successful, the effect on metalworking in the next decade will be tremendous.

For example, Westinghouse's Dr. John Kelly says it "is quite reasonable" that, by 1970, these applications will be realized: 1. Domestic refrigeration. 2. Heat pumping (replacing vapor compression systems). 3. Power generation of millions of watts for use by utility companies, for propulsion of ships, and to power a wide variety of industrial machines where high current, low voltage, direct current would be useful.

Whirlpool offers this timetable: Five years from now, common applications will include water coolers, refrigerators up to 6 cu ft, a large range of instrument cooling, the cooling of submarines. Ten years from now, a limited amount of domestic air conditioning and heat-

ing will be done thermoelectrically.

General Instrument foresees "even an automobile powered thermoelectrically." It would solve the exhaust problem and probably require far less maintenance and service.

Dr. Sebastian Karrer of 3M believes a forced air furnace independent of any outside power source is an "ideal" application. Heat from the furnace would provide the power for the forced air system. There would be no heat loss.

Dr. Karrer adds that we may see thermoelectric bicycles, and cars powered by a central thermoelectric generator with only a small motor in each wheel.

General Dynamics Corp. reports that high temperature nuclear reactors may be ideally suited to use with thermoelectric conversion devices. Westinghouse adds that thermoelectricity might supplement conventional methods of power generation by taking advantage of heat energy now wasted. Or the device could operate ahead of conventional apparatus at temperatures such equipment cannot withstand.

An RCA researcher suggests miniature thermoelectric dehumidifiers for packaged cereals, crackers, and like foods. He also proposes decentralized refrigeration: Thermoelectrically refrigerated drawers would be scattered around the kitchen.

Many Materials in Research

The search for and development of improved thermoelectric materials is probably getting the majority of the dollars that companies are pouring into the field. A vast range of materials is being studied.

The most promising one at present is bismuth telluride, many researchers told STEEL. A new bismuth telluride alloy just developed by Materials Electronic Products will permit an efficiency equal to 60 per cent of that obtained with a conventional, motor-compressor refrigerator, the firm claims. Merck & Co., Rahway, N. J., is producing a somewhat similar material.

Union Carbide Corp.'s long range objective is to develop thermoelectric materials to perform above 1832° F. Electrical power from thermal conversion is possible, in principle, up to 3632° F, and 5432° F is not an unreasonable goal, asserts the company.

SNAP III thermoelectric power source developed by Minnesota Mining & Mfg. Co. and Martin Co. for the Atomic Energy Commission. The 5 lb device generates 5 watts of electricity with no moving parts

Battelle is studying a wide range of materials, including compounds and their alloys, from these systems: Copper, silver, gold-sulfur, selenium, tellurium; zinc, cadmium, mercury-arsenic, antimony, bismuth; alkaline-earth metals and alkali metals.

Westinghouse is doing considerable development work on the mixed valence oxides of the transition metals. The company says work on several materials in this family "offers a real promise."

Materials with high melting points are needed for generators. A Navy spokesman thinks these should be investigated: Alloys of aluminum and phosphides, molybdenum, beryllium, and scandium nitride.

Among materials being studied by 3M: Lead telluride doped with bismuth, lead telluride doped with sodium, and manganese telluride doped with sodium.

GE is reportedly investigating liquid semiconductors.

The Major Problems

Westinghouse says the main problem in producing practical devices is the fabrication of materials. Metals are too inefficient for either refrigeration or power generation, the company asserts. Semiconductors offer promise for refrigeration, but their efficiency drops off with increased heat, so they don't appear practical for power generation, says Westinghouse.

Other problems include: 1. Lowering contact (junction) resistance. It poses a severe design problem. 2. Designing adequate heat exchangers. 3. Developing mass production techniques. 4. Effects of vibration, atmospheres, radiation, shock, and material aging must yet be studied.

Get Set for Changes

The commercial development of thermoelectricity is sure to bring about significant changes in industry. Markets will shift; new production processes will be needed; the designer will face a tremendous challenge to package the tiny powerhouses and design complex equipment around them; excessive maintenance will give way to reliability; the elimination of moving parts will permit noiseless and vibrationless operation; efficiency may be completely independent of size; wasted heat energy can be converted to power auxiliary equipment; new uses for present products will result from the ability to design small items with high efficiency.

Those, and many other developments, point up the need for the metalworking manager to familiarize himself with thermoelectricity today. Here are some examples of the effects it will have on industry:

Thermoelectric devices will require related metal parts, such as housing and heat transfer structures, opening up markets for metalworking, points out 3M's Dr. Fritts.

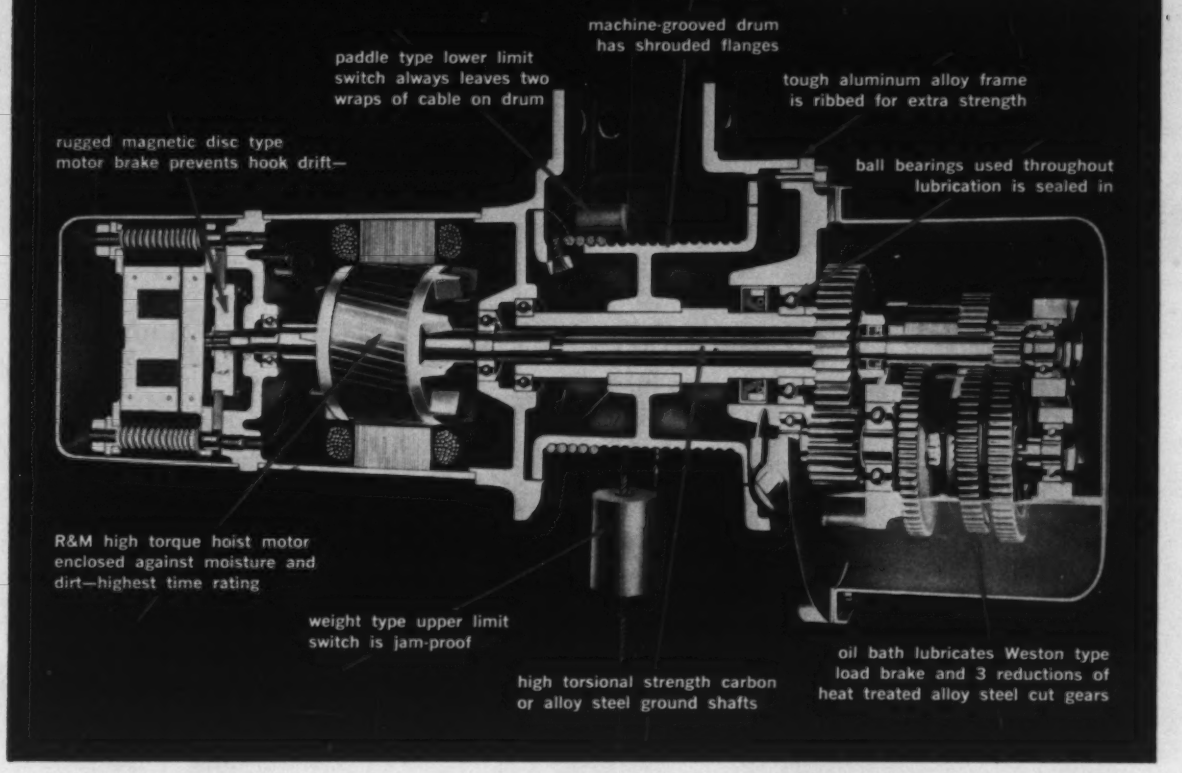
Adds Whirlpool: Condenser and evaporator manufacturers could make heat transfer surfaces for the new systems. Facilities for handling thermoelectric materials will have to be provided.

Perhaps we'll need new alloys that are oxidation and corrosion resistant at elevated temperatures, good conductors of heat, but without any usual strength requirements since there will be no moving parts, Westinghouse predicts.

General Instrument sums it up: "The introduction of a vast new technology to provide unlimited and unknown markets for all industry."

• *For a free copy of this article, write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Your use of material like this in STEEL may win you $1000. For details, see Page 6.*

HOISTS / CRANES


machine-grooved drum has shrouded flanges
paddle type lower limit switch always leaves two wraps of cable on drum
tough aluminum alloy frame is ribbed for extra strength
rugged magnetic disc type motor brake prevents hook drift—
ball bearings used throughout lubrication is sealed in
R&M high torque hoist motor enclosed against moisture and dirt—highest time rating
weight type upper limit switch is jam-proof
high torsional strength carbon or alloy steel ground shafts
oil bath lubricates Weston type load brake and 3 reductions of heat treated alloy steel cut gears

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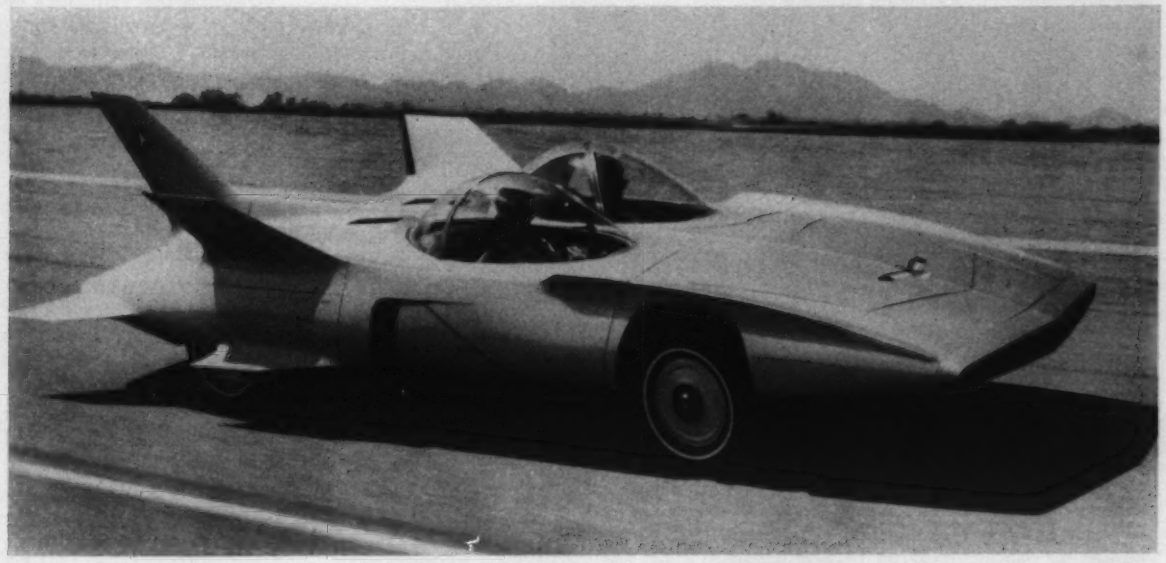

Like the auto stylists, production managers have to look ahead. Here's a summary of . . .

How Production Men View 1970 Cars

MANY of you will be supplying equipment and parts for the 1970 models, so it's worth a little blue skying to see what Detroit's stylists, designers, and engineers have in mind.

They'll Still Look Like Cars

In most basic respects, the 1970s won't be much different from the 1960s. Body dimensions will be about the same. Engines will be located both front and rear, and most of them will be water cooled, reciprocating, piston jobs. Turbine engines (for some trucks and special use vehicles) will be brand new. One thing sure: By 1970, several different types of cars will have evolved to meet buyer needs. Today's compacts are only a start.

George W. Walker, Ford Motor Co.'s styling vice president, explains: "There is growing evidence that we're drifting away from the idea that one car has to serve every purpose. It is apparent that people are going to buy cars according to their needs as well as their wants."

Ford thinks that as many as nine different types of cars will be developed—ranging from small, 90 in. wheelbase runabouts to the 130 in. wheelbase luxury cars. Some models will be designed for highway travel. Compact jobs will be used for suburban stop and shop driving. Station wagons will have their own body shells and functional designs.

They Can't Get Much Lower

From the body designer's standpoint, one requirement won't be changed: The size of his passengers. Robert F. McLean of General Motors' styling staff points out that seating requirements for a 6 ft man call for 30 in. of headroom, 24 in. of shoulderroom, 30 in. of elbowroom, and 20 in. of hiproom. Height must total 43 in.

That means it may be possible to lower 1970 cars to 48-50 in., but that's about the limit. Corvair and some of the foreign cars are almost there now. You may question whether cars should be that low, but stylists claim the car buying public has asked for it. Asserts Mr. Walker: "The average person gets in and out of a car only four times a day. He doesn't seem to mind stooping if he's proud of the car he owns."

To get the "proud," low look, unitized bodies are a must, and virtually all cars with wheelbases under 125 in. will have them by 1970.

Obviously, you'll be stepping down into the car, so part of the roof section will flip back for easy entrance. Seats will be thinner too. In your 1970 chariot, you're apt to find polyurethane poured directly over flat springs. The combination will provide soft seating with only half the thickness of today's seats.

In Lab Today, Product Tomorrow

Central hydraulic systems will be standard on most 1970 cars. Power actuated disc brakes will be used on the larger vehicles, but conventional drum brakes still will be

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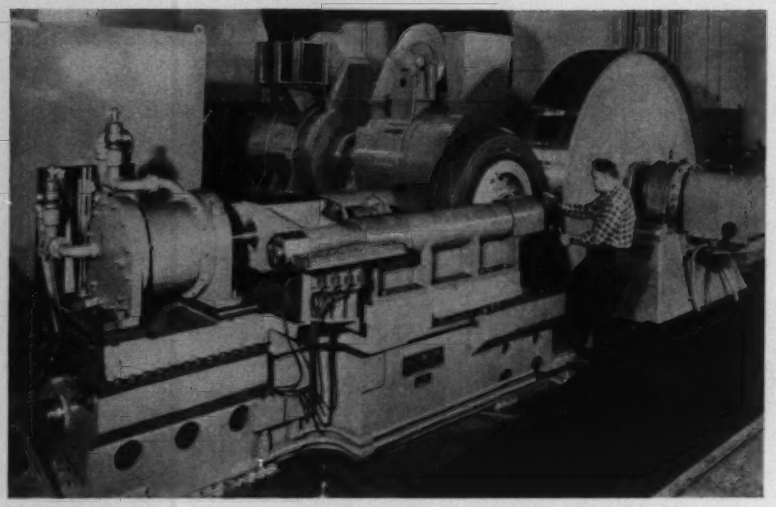


A $2 MILLION TIRE TESTER, known as a multistage dynamometer system, enables technicians at Goodyear Tire & Rubber Co., Akron, to develop, test, and qualify tires for the highest performance jet aircraft and racing cars. The new machine can test airplane tires at surface speeds up to 320 mph and loads of over 80,000 lb. Racing tires can be accelerated to more than 500 mph. The machine, built by Adamson United Co., Akron, is powered by two electric motors which produce 8600 hp

popular on the lighter makes—though their design will differ from today's. Wheels and drums still will be stamped and cast from ferrous metals, but the backup structure and hub will be cast aluminum to reduce weight and cut costs. Air-oil suspension systems will be widely used on heavier cars. Most of the compact models will have flat torsion bars.

Spare tires will have been eliminated in another decade. The captive-air type of tire will be commonplace. Many of the smaller cars will probably be using some version of the Pirelli BS3 tire which has an inflatable body and three steel reinforced tread sections that are slipped over the outside. The treads can be easily replaced as they wear out, and you'll be able to buy an extra set of snow tread bands for winter driving.

Order Your Own Horsepower

There'll be few cast iron engine blocks in 1970. Most of the piston engines will have aluminum blocks, heads, and pans. If designers can work out an old theory, you'll probably find pistons cast into block segments, and the number of pistons you want will be bolted together on the assembly line. You can order four, six, or eight cylinders—depending on the type of car you're buying and the amount of displacement and horsepower you'll need.

It's most unlikely that you'll see any free piston powerplants. Turbines will be used in over-the-road trucks. Diesels will be commonly accepted as the best way to power taxicabs and multistop delivery vans. Unless there are some radical breakthroughs in the electric power field, battery driven cars and trucks will be no more plentiful than they are today.

Accent on Production Efficiency

In building 1970 cars, automakers will make practical use of manufacturing techniques they're beginning to familiarize themselves with now. Machining lines will be set up to handle either gray iron or aluminum with simple changes in heads and transfer equipment. Numerically controlled tools will be the accepted way of machining complicated parts.

No matter how hard they try, carbuilders won't be boosting productivity rates faster than their manufacturing costs rise in 1970. That means the demand to reduce the number of operations in finishing components will be even greater than it is today. Because of precision molding, the amount of plastic parts in cars will be triple what it is today. Automatic die-casting lines will have replaced permanent and sand mold facilities for casting aluminum parts. Bumpers and simple trim strips will be extruded instead of stamped.

Plastic tooling will be used almost exclusively for short production runs. Chrysler Corp. has already used plastic dies that can turn out 20,000 parts. L. L. Linzell, staff tool and die engineer, reports on a Chrysler cost study of a draw die punch and pad for an inside quarter panel: "We found than an all plastic punch and pad die would result in savings of 40 per cent over a boiler plate punch and pad die."

Those are just a few of the changes Detroit expects to see in its 1970 cars. Not all of them will come to pass. Some will come sooner than expected. Pointing up the hazards of crystal balling, Edmund E. Anderson, American Motors Corp.'s styling director, remarks: "It's a lot easier to design a car of the future than it is to plan next year's models. You don't have to be as specific in your planning. But I'm sure of this, whatever kinds of cars we'll have in 1970 will reflect the tastes and desires of the buying public."

U. S. Auto Output

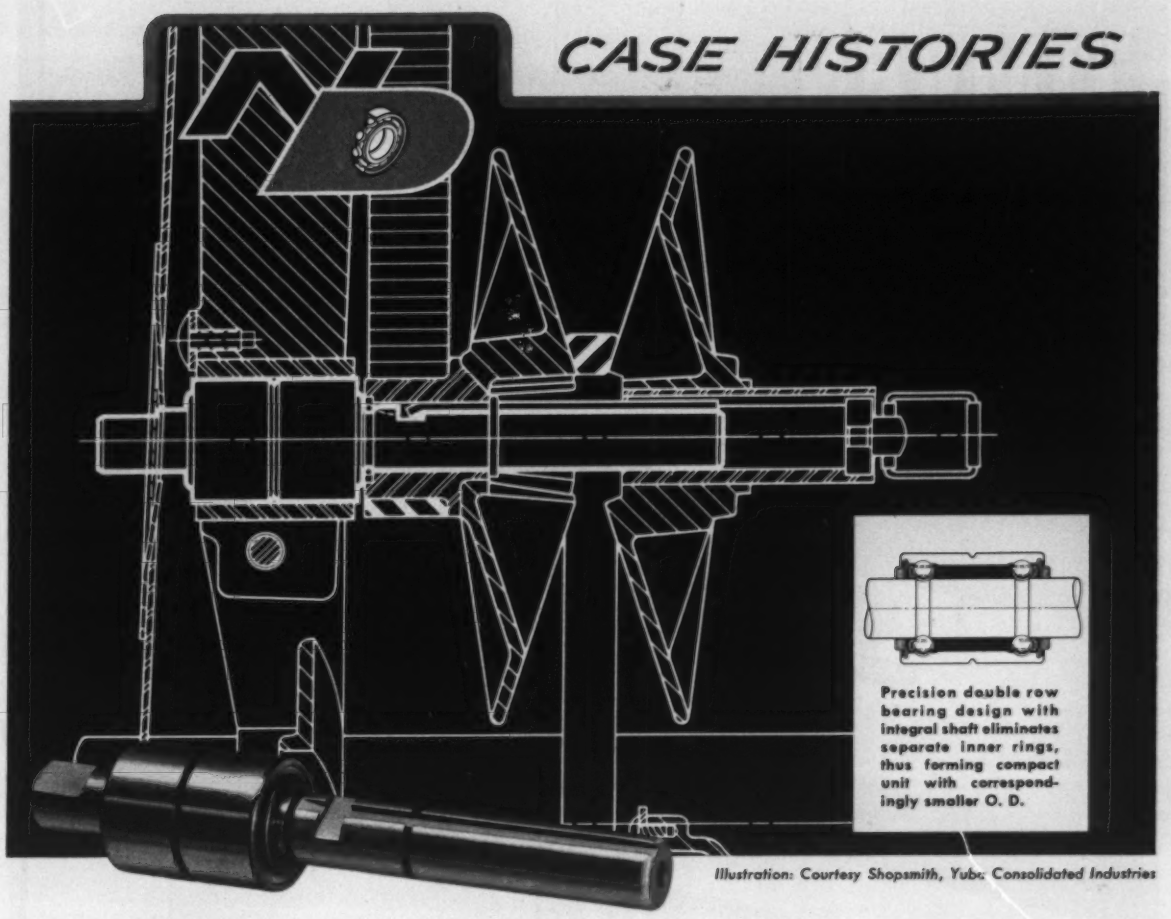
Passenger Only

	1960	1959
January	688,731	545,757
February		478,484
March		576,085
April		578,825
May		546,817
June		557,994
July		555,418
August		239,152
September		258,157
October		507,530
November		254,527
December		494,931
Total		5,593,677

Week Ended	1960	1959
Jan. 23	175,060	126,843
Jan. 30	173,231	119,678
Feb. 6	164,027	114,282
Feb. 13	153,186	115,491
Feb. 20	158,723†	120,780
Feb. 27	154,000*	127,783

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

CASE HISTORIES



Precision double row bearing design with integral shaft eliminates separate inner rings, thus forming compact unit with correspondingly smaller O. D.

Illustration: Courtesy Shopsmith, Yuba Consolidated Industries

N/D Bearing Solves Home Power Tool Speed Changing Problem!

CUSTOMER PROBLEM:

Require low cost, compact idler shaft assembly for speed changer in popular, multi-purpose home power tool. The assembly must mount on ball bearings . . . operate at speeds up to 6000 RPM.

SOLUTION:

N/D Sales Engineer, cooperating with customer engineers, recommended a *single* N/D ball bearing —a compact integral shaft unit designed as part of idler assembly. The unit permits one of two interlocking variable pitch pulley halves to slide axially on shaft when changing pitch at high speed. This precision, automotive type fan and water pump bearing eliminates extra parts inventory and shaft machining . . . reduces assembly time. In addition to solving complex design problem, N/D's compact heavy-duty ball bearing is integrally sealed for protection against saw-generated dust . . . and lubricated-for-life for added end user sales appeal!

If *you're* designing new equipment, why not call your New Departure Sales Engineer. He probably can help engineer your application with a standard, volume-produced N/D ball bearing that will help solve your bearing problem. For more information contact New Departure Division, General Motors Corporation, Bristol, Connecticut.

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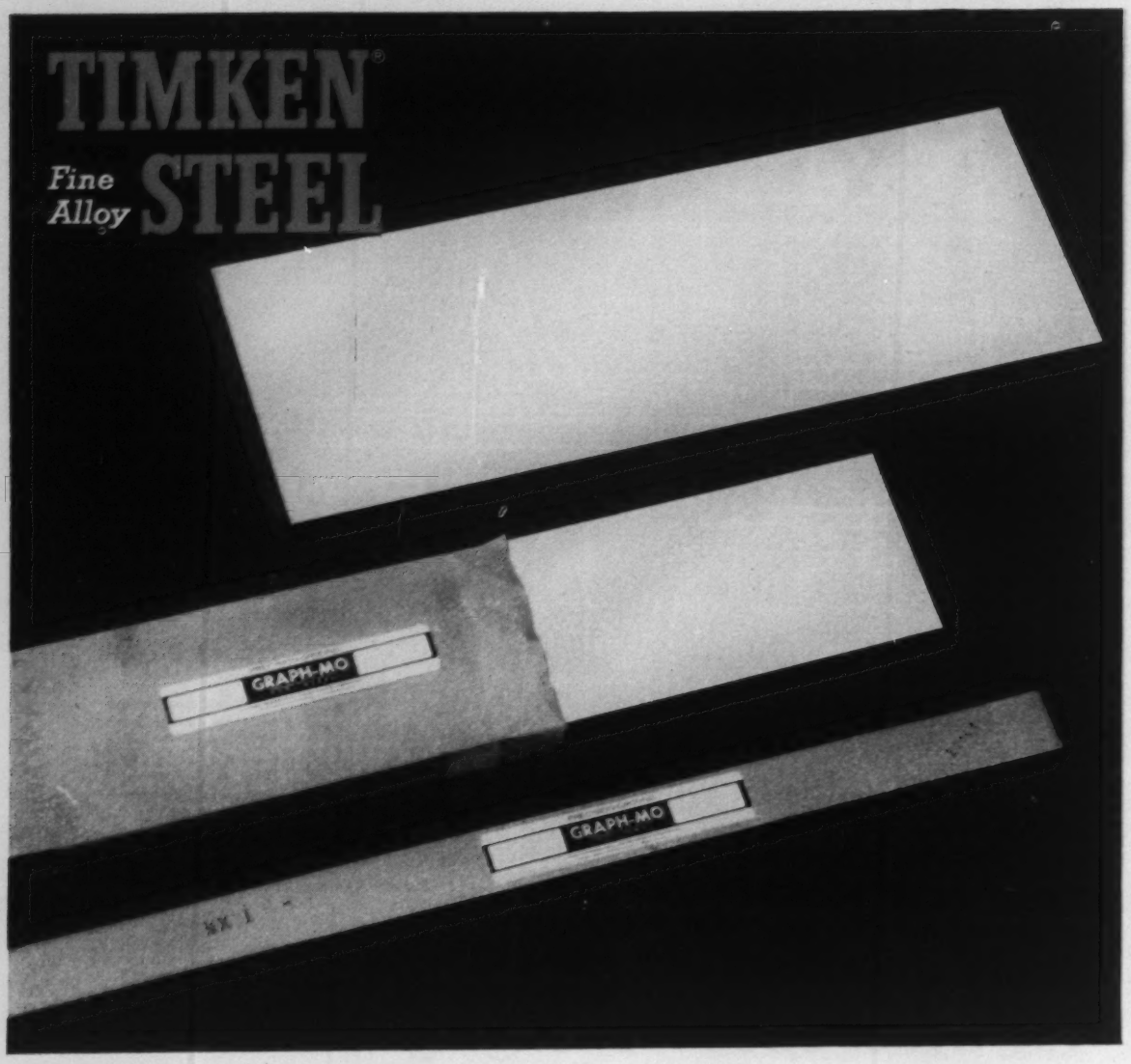

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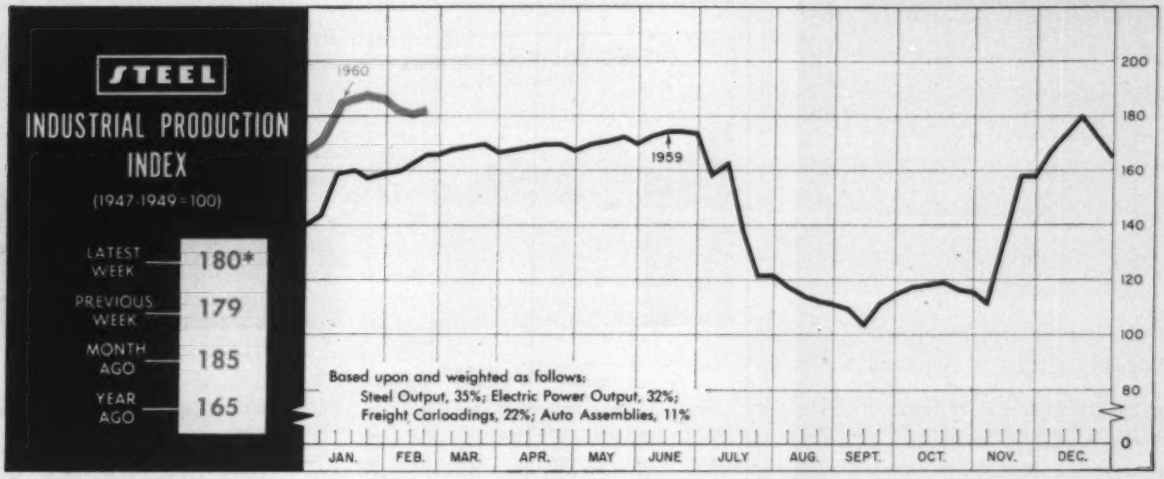

*Week ended Feb. 20.

Economy Settling on High Plateau

HIGH PLATEAU: You might as well get used to that phrase because you'll hear it often during the rest of 1960 and perhaps a good portion of 1961.

The zip is gone from the boom following the steel strike. It does not mean that the economy has spent itself, but it does mean you probably won't see any more 4 to 9 point advances in the Federal Reserve Board's industrial production index as you did in December and January. (See graph and table, Page 68.) Gains of 2 points during the rest of this year will be considered good. An occasional loss of a point or two may show up.

• **Narrow Range**—Ten bank and industrial economists were asked last week: "Do you think the FRB index will dip to 163 or go as high as 175 during the rest of 1960?" (A 6 point spread on either side of the January level of 169 per cent of the 1947-49 base, seasonally adjusted.) Six said it will do neither; four said it will break 175 in the fourth quarter. The consensus: The index will fluctuate within the 169-175 range.

They added: Each quarter, measured in terms of the gross national product, will be better than the one before it. Reasons: 1. Personal consumption expenditures, spurred by continually rising income, will advance. 2. Spending for services will continue upward. 3. Total government spending will increase (mostly in the state and local sectors). 4. Capital goods expenditures will expand.

• **Precedent** — So far, the current business cycle is behaving remarkably like its predecessor despite the unusual length of the steel strike. From the start of the recovery in 1954 to the start of the recession in 1957, the up cycle was 41 months long. At the 18 month point, the FRB index leveled off for nine months until the 1956 steel strike. It was followed by a 2 month surge

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,678[1]	2,674	2,506
Electric Power Distributed (million kw-hr)	14,100[1]	14,071	13,259
Bituminous Coal Output (1000 tons)	8,360[1]	8,520	8,175
Crude Oil Production (daily avg—1000 bbl)	7,250[1]	7,256	7,208
Construction Volume (*ENR*—millions)	$342.2	$374.8	$401.5
Auto, Truck Output, U. S., Canada (*Ward's*)	158,723[1]	153,186	120,780
TRADE			
Freight Carloadings (1000 Cars)	590[1]	580	583
Intercity Truck Tonnage (changes from year ago)	+3.1%	+5.7%	+12.0%
Business Failures (Dun & Bradstreet)	317	318	292
Currency in Circulation (millions)[3]	$31,631	$31,599	$31,205
Dept. Store Sales (changes from year ago)[3]	+4%	+3%	+8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,377	$23,785	$24,301
Federal Gross Debt (billions)	$290.5	$291.0	$285.1
Bond Volume, NYSE (millions)	$30.7	$27.5	$32.3
Stocks Sales, NYSE (thousands of shares)	17,290	13,484	18,505
Loans and Investments (billions)[4]	$102.9	$102.2	$94.3
U. S. Govt. Obligations Held (billions)[4]	$26.1	$26.4	$31.6
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	234.8	234.5	218.1
All Commodities[7]	119.2	119.2	119.4
Commodities Other than Farm & Foods[7]	128.6	128.6	127.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

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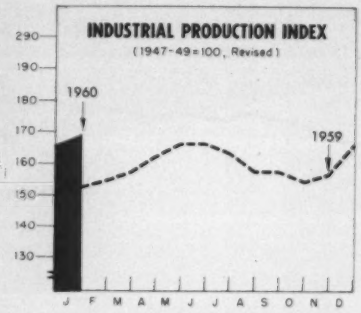
THE BUSINESS TREND



(Seasonally adjusted)

	Total Production		Total Mfg.		Durables Mfg.	
	1960	1959	1960	1959	1960	1959
Jan.	169	152	169	150	181	156
Feb.	...	154	...	153	...	160
Mar.	...	157	...	156	...	165
Apr.	...	162	...	161	...	170
May	...	166	...	165	...	177
June	...	166	...	166	...	178
July	...	163	...	163	...	171
Aug.	...	157	...	156	...	158
Sept.	...	157	...	156	...	157
Oct.	...	154	...	153	...	155
Nov.	...	155	...	154	...	155
Dec.	...	165	...	164	...	172
Avg	...	159	...	158	...	164

Federal Reserve Board. *Revised.

	1959	1958	1957	1956
Jan.	115.84	93.07	126.34	122.43
Feb.	124.77	93.49	139.29	129.56
Mar.	146.36	97.89	140.76	166.14
Apr.	147.28	122.36	132.67	145.20
May	164.45	118.04	157.95	155.53
June	170.72	131.15	121.57	189.13
July	130.26	134.34	128.31	165.50
Aug.	87.02	104.46	110.09	168.70
Sept.	126.43	85.41	116.79	130.35
Oct.	131.09	111.35	124.80	143.35
Nov.	124.16	110.88	87.80	138.50
Dec.	113.78	105.97	105.65	117.76
Avg	131.85	109.87	124.34	147.68

Material Handling Institute Inc.

Charts copyright, 1960, STEEL.

which took the trend line a little above the prestrike level, where it stabilized for another 14 months.

The current uptrend started in April, 1958, and continued until the spring of 1959. It was showing signs of leveling off when the steel strike hit and took it down for the next five months. Now it has rebounded slightly past the prestrike level and is showing signs of leveling off in the twenty-second month of the cycle. If the historical pattern holds, "high plateau" could be the watchword for nearly two years.

• **Inventories, the Key**—Inventories are still the second most important element in the outlook. (Consumer spending ranks first; and few economists are worried about it.) The rapid buildup in the final 1959 quarter (annual rate of $3 billion) surprised many business analysts. But it proved that the nation's productive capacity, notably steel and autos, is sufficient to meet any foreseeable demand.

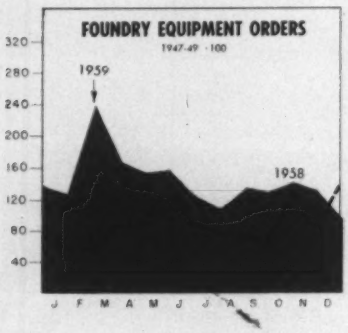
If businessmen continue to follow the conservatism prevalent in the last couple of weeks, the topping out of the boom can mean continued prosperity for a long time to come. Reason: Managers won't let inventories get out of hand.

Capital Goods Lagging

Another big factor in the outlook for 1960 is spending for capital goods. Many producers report that orders since the strike have not been up to forecasts, but they feel confident that an uptrend will develop this year.

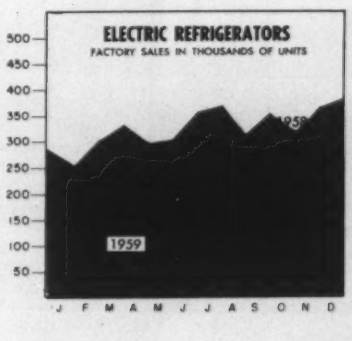
The Value Line Investment Survey, New York, feels that the earlier forecast of a 15 per cent rise in capital spending can be realized, but "there will have to be a sharper rate of gain than we've had thus far this year." It says the prospects for the various sectors of the machinery industry are mixed, with the makers of construction machinery, material handling equipment, and steel mill machinery listed on the favorable side of the ledger. Makers of steam generating equipment and oil field supply machinery will not fare as well.

The survey indicates: Orders for machine tools may remain at the present level until September, when The Machine Tool Exposition—1960 will stimulate sales. And if the auto industry finds that it must increase production of compact cars, a flood of tool orders in the second half may trigger full recovery of the industry.



	1959	1958	1957
Jan.	127.4	57.9	117.9
Feb.	237.1	57.6	188.4
Mar.	166.6	85.9	127.0
Apr.	154.2	88.7	101.1
May	157.0	136.1	136.2
June	125.1	87.7	187.5
July	110.7	77.9	98.6
Aug.	134.1	74.1	231.3
Sept.	131.3	64.5	113.9
Oct.	140.8	118.9	145.3
Nov.	131.2	83.3	59.6
Dec.	95.9	137.0	61.4
Avg	142.6	89.1	130.7

Foundry Equipment Mfrs. Assn.



	1959	1958	1957
Jan.	256,200	206,100	305,400
Feb.	306,200	227,800	298,700
Mar.	333,700	261,100	309,300
Apr.	301,000	210,800	281,600
May	308,200	262,900	303,700
June	361,000	316,300	305,100
July	370,800	279,700	318,000
Aug.	314,100	245,900	240,500
Sept.	355,700	295,200	265,200
Oct.	329,600	277,500	261,500
Nov.	265,900	245,500	246,400
Dec.	282,600	288,900	214,600
Totals	3,785,000	3,116,700	3,350,000

National Electrical Mfrs. Assn.

Uptrend Is Coming

James M. Dawson, vice president and economist for the National City Bank of Cleveland, gives three reasons for confidence in the uptrend in capital expenditures.

1. New plant and equipment expenditures since 1958 have been low relative to the total economy in comparison with other postwar years.

2. The current uptrend in this spending has been underway five quarters, only about half as long as the 1955-57 cycle.

3. Corporations not only can finance the current capital spending pace—"they can afford to raise it! Corporation retained earnings and depreciation last year exceeded capital outlays by 13 per cent, and a similar coverage exists in 1960's opening quarter. The only other postwar years in which internal funds exceeded such outlays were 1950 and 1955. Both those years were followed by substantial increases in capital spending."

Industry Trends Mixed

The latest statistical reports from metalworking and related industries fail to show a clear trend. The ups are counterbalanced by the downs.

Shipments of commercial steel forgings in December increased substantially to 114,424 net tons, and backlogs rose about 15,000 tons to 420,118 tons.

Production of bituminous coal is close to 52.8 million tons compared with about 51.4 million tons in the corresponding 1959 period.

Shipments of steel castings in November inched up to 109,460 tons, while backlogs rose by about 33,000 tons. But both shipments and backlogs of gray iron and malleable iron castings declined.

Contracts for future construction in January declined 5 per cent from the year-ago total, reports F. W. Dodge Corp. But *Engineering News-Record* reports contracts for the first seven weeks of 1960 are 4 per cent above those of the similar 1959 period.

New orders for foundry equipment dropped to 95.9 (1947-49 = 100) in December, the lowest point since November, 1958. (See chart above.)

New orders for railroad freight cars totaled 7149 last month compared with 10,560 in December and 4007 in January, 1959.

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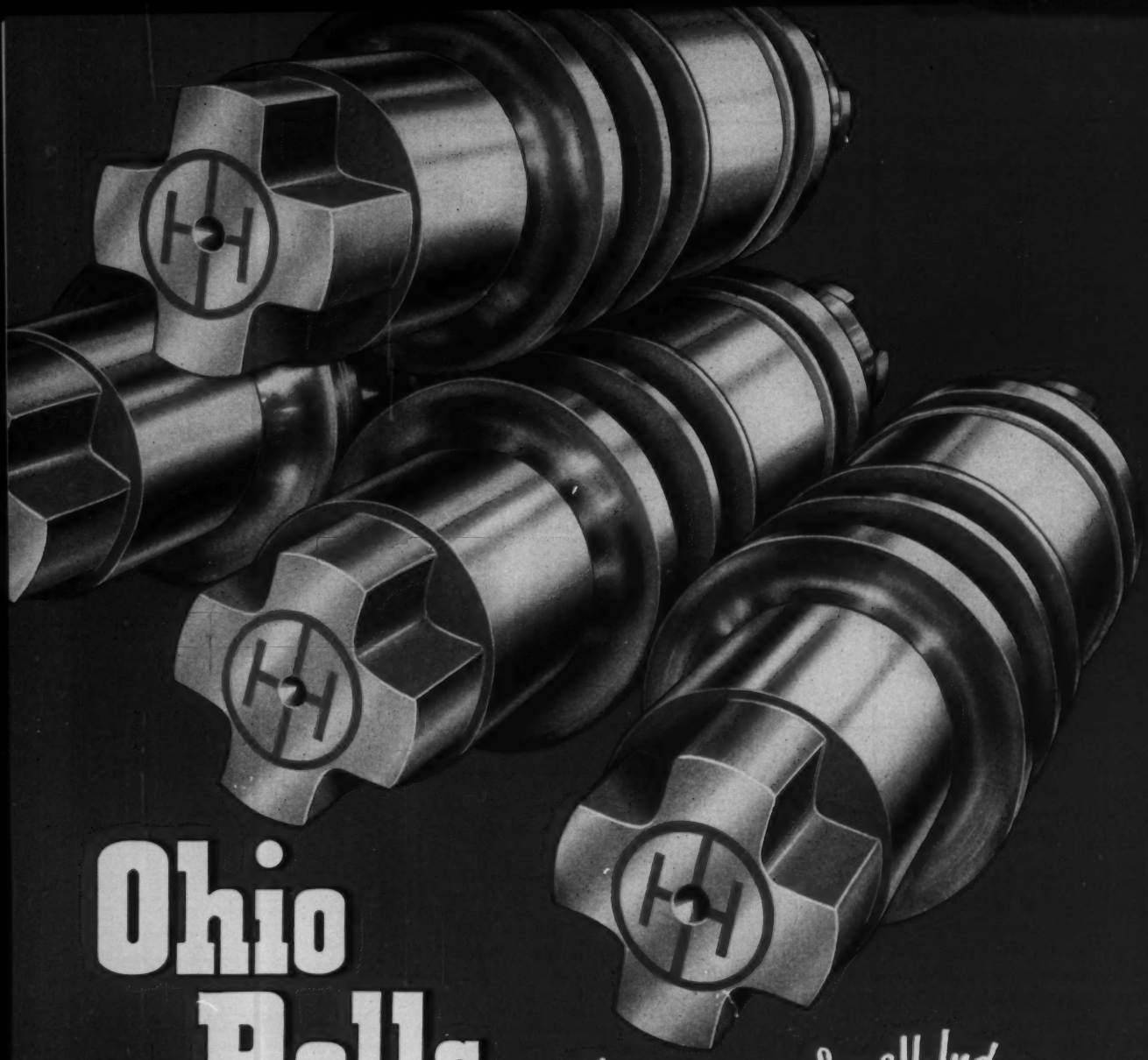

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FLOYD L. PASCHKE
Rotor Tool sales mgr.

A. E. ALLEN
Symington Wayne v. p.

THOMAS T. LLOYD
Albion Malleable v. p.

JEROME G. FRIEDMAN
Budd Lewyt gen. sales mgr.

Floyd L. Paschke was made sales manager, **Rotor Tool Co.**, Cleveland, subsidiary of Cooper-Bessemer Corp. He was Western application engineer in charge of sales in the Midwest and Southwest.

Francis Cameron was elected president, **St. Joseph Lead Co.**, New York, succeeding **Andrew Fletcher**, elected chairman, an office vacant since retirement of the late Clinton H. Crane in 1957.

Kenneth A. Long and **J. R. Renfrew** were elected vice presidents of **Aluminum Industries Inc.**, Cincinnati. Mr. Long joined the firm in August coming from Cummins Engine Co. Inc. where he was manager of manufacturing. Mr. Renfrew was assistant vice president, Triplex of America Div., Aluminum Industries.

Carl Boyer Jr. was made chief engineer, **Rubicon Instruments Div.**, Philadelphia, Minneapolis - Honeywell Regulator Co.

Dwight H. Lory was made manager of materials, Norwood, Ohio, Works, **Allis-Chalmers Mfg. Co.**

Donald Smith was promoted to plant engineer of **Michigan Seamless Tube Co.**, South Lyon, Mich.

Doehler-Jarvis Div., Toledo, Ohio, National Lead Co., made the following promotions in its Research & Engineering Dept.: **George F. Hodgson** director of research, **Henry L. Byrne** assistant to the chief engineer, **Byron W. Koch** chief product development engineer.

A. E. Allen was made vice president for planning, a new post at **Symington Wayne Corp.**, New York. Former head of the company's Ft. Wayne, Ind., and Ironton, Ohio, manufacturing plants, he will assist the president with corporation long range planning and with new acquisitions.

Thomas T. Lloyd was made vice president - manufacturing, **Albion Malleable Iron Co.**, in charge of operations at the Albion, Mich., and Muncie, Ind., Divisions, the latter a recent acquisition. **Frank V. Jasienski**, former operations manager at Albion, was made plant manager at Muncie, and **Donald I. Huisenga**, foundry superintendent at Albion, was made plant superintendent at Muncie. Other Albion appointments: **Richard H. Dobbins** plant manager, **C. Russell Baker** chief engineer, **Roland H. Behling** design engineer, **Wendall D. Dickmeyer** plant superintendent.

J. William Hinkley was elected president of **Research-Cottrell Inc.**, Bound Brook, N. J. He succeeds **James M. Knox**, resigning due to illness. Mr. Knox was elected vice chairman of the board. Mr. Hinkley is also president of Research Corp., of which Research-Cottrell is a subsidiary.

Algie A. Hendrix, former assistant manager, was made manager of General Motors Corp.'s **AC Spark Plug Div.** operations in Milwaukee. He succeeds **Leo W. Tobin Jr.**, transferred to a major post (to be announced) in GM's new Defense Systems Div. in Detroit.

Jerome G. Friedman was appointed general sales manager, **Budd Lewyt Electronics Inc.**, subsidiary of Budd Co., Long Island City, N. Y.

Myles M. Walker was made manager of marketing, **Chapman Valve Mfg. Co.**, Springfield, Mass., subsidiary of Crane Co. He was with Raytheon Co.

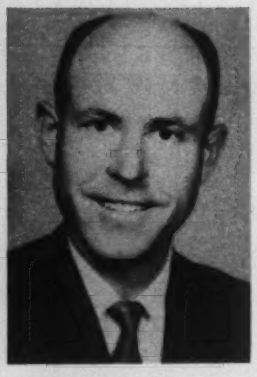
Adrien F. Busick Jr. was made president and general manager, **Marion Power Shovel Co.**, Marion, Ohio, division of Universal Marion Corp. He was executive vice president-general manager. The division presidency has been vacant since 1958. **David Reich** retains his post of vice president-administration of the division and assumes new duties as assistant to the corporation president.

John L. Holmquist was made director of research-tubular products, **National Supply Co.**, Pittsburgh. He is succeeded as director of product engineering at the Ambridge, Pa., plant by **Thomas L. Blose. Lawrence W. Peugeot** was made assistant chief engineer there.

Roger M. Wolcott was named to the new post of assistant director-production planning programs by **Jones & Laughlin Steel Corp.**, Pittsburgh. He was assistant to the vice president-engineering and plant. **Walter L. Moore** fills the new post of co-ordinator-production planning control procedures.

Melville J. Patterson joined **K. H. Huppert Co.**, Chicago, as sales manager. In addition, he will direct

ROBERT F. STEWART



WILLIAM E. ARCHER

Western Precipitation Div. appointments

HARRY L. BUCK

A. E. MACKENZIE

elected to new positions at I-T-E

expansion of the Engineering Dept.

Robert F. Stewart was made vice president and assistant general manager, Western Precipitation Div., **Joy Mfg. Co.**, Los Angeles. He was vice president-sales for the dust collecting equipment manufactured by the division. **William E. Archer** was made manager of research and development for the division. He was its chief development engineer.

R. E. O'Neill was named vice president-sales, **Atlantic Steel Co.**, Atlanta. He was general sales manager.

Lyn S. Cox was made manager-saw blade sales, **Ladish Co.**, Cudany, Wis. He was chief buyer of supplies.

Austin D. Vanderbilt was named manager-industrial engineering for **Crouse-Hinds Co.**, Syracuse, N. Y.

Harold S. Mercier, former general sales manager, was elected vice president-sales, **Tool Steel Gear & Pinion Co.**, Cincinnati. He is succeeded by **R. L. McGrath**, former assistant general sales manager.

Ralph J. Spresser was made Detroit district manager, **National Acme Co.**

Ben R. Shipley was promoted to sales manager, **Vesuvius Crucible Co.**, Swissvale, Pa. **Crawford B. Murton** was made manager of marketing and development.

Hickok Electrical Instrument Co., Cleveland, named **Jerry M. Rhoads** production superintendent, **John Kushan** production control manager.

James W. Hughes was made sales manager of **Minneapolis-Honeywell Regulator Co.'s** Valve Div. at Ft. Washington, Pa. He is succeeded as industrial manager, Midwest region, Chicago, by **C. D. McIntire.**

George A. Jedenoff was appointed general superintendent of U. S. Steel Corp.'s **Geneva Works**, Utah. He was general superintendent of the Pittsburg, Calif., plant.

Harry L. Buck fills the new post of executive vice president, **I-T-E Circuit Breaker Co.**, Philadelphia. He was vice president and general manager. **A. E. Mackenzie**, former vice president and general manager, Kelman Power Circuit Breaker Div., Los Angeles, fills the new post of vice president-power equipment.

Harold C. Potter was made sales manager, Semiconductor Products Dept., **General Electric Co.**, at Syracuse, N. Y.

Weston Instruments Div., Daystrom Inc., Newark, N. J., named **Emil Nichols** commercial market manager, **Richard E. Love** industrial market manager, **Ralph S. Lehman** military market manager.

Martin F. Scheider joined **White Diesel Engine Div.**, White Motor Co., Springfield, Ohio, as foundry manager.

Byron Mumaw was made superintendent of Machine and Erection Shops for **E. W. Bliss Co.'s** Rolling Mill Div. at Salem, Ohio. He was

HAROLD S. MERCIER

Tool Steel Gear v. p.

JAMES W. HUGHES

Honeywell-Valve Div. sales

GEORGE A. JEDENOFF

Geneva Wks. gen. supt.

BYRON MUMAW

Bliss div. shops supt.

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"Don't have to change knife clearance"

No adjustments needed for cutting different thicknesses of stock . . . even at the same time . . . with consistently accurate, burr-free results. *And much longer knife life!* The secret is in the rigidity of Niagara's exclusive box section design. "Upped production 25%," says one user, "because we have fewer adjustments to make."

"Costs less to operate"

There's less to do, less to learn and less to go wrong. Never even have to worry about damaging the machine by forgetting to change the knife clearance. Once set, Niagara Shears need no further adjustment. "Been using Niagara's for 10 years . . . never had downtime for repairs or maintenance," says another user. Even after long, hard use when it becomes necessary to turn the blades or change knives, it's a very easy matter. Nothing like Niagara Shears for simplicity.

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C. L. RICHARDS
Tormag Products mgr.

BLANCHARD M. HUGHEY
U. S. Steel div. supt.

WILLIAM A. MATTHEWS
Kollsman works manager

T. AMES WHEELER
Allegheny Ludlum v. p.

JOHN M. MELISZ
chief engineer at Winsmith

WALES A. OTIS
Ronson Metals div. sales

assistant machine shop superintendent.

T. Ames Wheeler, controller of **Allegheny Ludlum Steel Corp.**, Pittsburgh, was elected vice president in charge of planning, a new post. **W. A. Kirkpatrick** succeeds as controller.

John M. Melisz was made chief engineer of **Winsmith Inc.**, Springville, N. Y. He was assistant chief engineer, Farnham Div., Wiesner-Rapp Co.

Arnold L. Shafer was made general manager, **Fitzsimmons & Co.**, Cleveland. He formerly was in purchasing at Thompson Ramo Wooldridge Inc.

Johan H. G. Maters was made executive vice president in charge of manufacturing at **Perkin Engineering Corp.**, El Segundo, Calif.

E. T. Syvertson and **James Cossitt** were made executive assistants to the vice president-sales of **Gabriel Div.**, Gabriel Co., Cleveland.

Wales A. Otis was made sales manager, Cerium Metals & Alloys Div., Newark, N. J., **Ronson Metals Corp.** He was with Vitro Chemical Co.

H. Earl Love was made assistant sales manager, Eastern Div., **Pyrometer Co. of America Inc.** He was in the Philadelphia sales office.

National Lead Co. elected **Carleton Smith** president of its subsidiary, **Canada Metal Co. Ltd.**, Toronto, Ont.

Daniel R. Loughrey was named to the new post of consultant to the superintendent, Open-Hearth Dept., Pittsburgh Works, **Jones & Laughlin Steel Corp.** He is succeeded as J&L's co-ordinator of steelmaking operations by **John F. Pollack. A. J. Parke Jr.** was made superintendent, Open Hearth Dept.

Henry B. Koehler was made manager-electrical sales, **Hanson-Van Winkle-Munning Co.**, Matawan, N. J.

C. L. Richards was made manager of Gleason Reel Corp.'s **Tormag Products Div.** In December, the manufacturing and sales rights of the Tormag magnetic drive were purchased from Whitney Chain Co. Tormag drives, under the Gleason-Tormag name, are manufactured at the Gleason Reel plant at Mayville, Wis. Mr. Richards was chief engineer at Whitney Chain. He has headquarters at executive offices in Milwaukee.

Blanchard M. Hughey was made division superintendent, Slabbing & Plate Div., Homestead District Works, Homestead, Pa., **U. S. Steel Corp.** He succeeds **John V. Dorman**, recently made assistant to general superintendent, Gary, Ind., Steel Works. **Wilmer W. Gosnell** succeeds Mr. Hughey as assistant division superintendent. **Oscar O. Nelson** was made superintendent of the 100 in. plate mill and **Frank W. Stanford**, assistant superintendent.

William A. Matthews was appointed works manager of **Kollsman Instrument Corp.** He is in charge of manufacturing at the Syosset and Elmhurst, N. Y., plants. He was production manager, Surface Armaments Div., Sperry Gyroscope Co.

Frank L. Friedli was named manager, **Reed D. Hamilton** assistant manager of Cooper-Bessemer Corp.'s **En-Tronic Controls Div.**, Mt. Vernon, Ohio.

OBITUARIES...

Norman I. Stotz, executive vice president, **Braeburn Alloy Steel Div.**, Braeburn, Pa., Continental Copper & Steel Industries Inc., and president of the division's sales subsidiary, Braeburn Alloy Steel Corp., died Feb. 22.

John E. Menz, 51, a vice president, **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif., died Feb. 14.

Edward S. Underwood, 83, vice president, **Metal Hydrides Inc.**, Beverly, Mass., died recently.

A. R. Carlson Sr., 66, president and treasurer, **Carling Turbine Blower Co.**, Worcester, Mass., died recently.

Harry Pelphrey, 58, director of research, **Michigan Tool Co.**, Detroit, died Feb. 18.

How to win the race to produce more hot metal

It's no longer simply "theory." Leading steel mills have proved that Island Creek Precisioneered Coking Coals can boost production significantly. If you want increased hot metal without the delay or expense of physical plant expansion (and actually at lower net cost per ton) get the complete, documented story from Island Creek engineers at once.

The technical story is something to get direct from Island Creek Coking Coal specialists. But the principle, itself, is just this simple: Island Creek Precisioneered Coals are from inherently superior metallurgical seams. They're lower in ash, sulphur and moisture. They are manufactured to precision standards. Result: improved coke yield and through-put, and a stronger coke, with more effective carbon. You use less coke, therefore, per ton of iron, save more furnace space for producing hot metal. And while you're getting this increased production, you're getting lower net costs. Island Creek has the tools (including a modern carbonization laboratory with test oven of full commercial width) to evaluate coking characteristics of coal blends and predict, in advance, results you'll be able to prove in a test run. Phone or write. No obligation.

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Scovill Plans to Double Aluminum Sheet Production

SCOVILL MFG. CO., Waterbury, Conn., is integrating the production of aluminum alloys—from the melting of basic aluminum to the rolling of finished sheets. The $5.5 million program is expected to double the company's output of aluminum sheets.

Scovill has been rerolling semi-processed, heavy gage material purchased from prime producers. The company has long experience with high capacity continuous casting of copper base alloys. During the last two years, intensive research with an experimental pilot plant has led to the perfection of a new and practical continuous casting process for aluminum. Company officials say it can produce a superior quality of finished sheets in volume.

The process: Pig and scrap are melted, molten aluminum is poured into the casting machine, solidified and hot rolled on a tandem mill, surface finished, and delivered at the end of the production line in wide coils, ready for cold finishing.

A special, four high, cold rolling mill with related finishing equipment will complement the hot process line to roll and finish the coils to customer specifications. The equipment will be set up in the Waterbury mill area formerly occupied by the Scovill tube mill—it was recently relocated in New Milford, Conn.

Buys Galvanizing Plant

Metal Coating Corp., Chicago, has purchased the hot dip galvanizing facilities of Lewis Bolt & Nut Co., Minneapolis. The transaction does not affect Lewis Bolt's Electroplating Div. in St. Paul.

Plans Rail Welding Plant

National Cylinder Gas Div., Chemetron Corp., Chicago, will build a rail welding plant near the mill of Tennessee Coal & Iron Div. at Ensley, Ala., on property made available by U. S. Steel Corp. Standard length rails will move directly from TC&I's rolling mill into the new plant to be welded into sections up to 1/4 mile long. Special rail handling equipment for the installation is being designed and built by Link-Belt Co., Chicago.

Heat Treating Firm Grows

Pittsburgh Commercial Heat Treating Co., a division of Cox Industries, Pittsburgh, is adding 1500 sq ft of floor space to its plant. New equipment will include two car bottom furnaces.

Plans Computer Plant

Computer Div., Bendix Aviation Corp., Detroit, will build a manufacturing plant adjacent to the division's headquarters in Los Angeles. Products will include the G-15 digital computer and its accessories and a new line of high speed transistorized computing equipment.

McKay Handles Wean Line

McKay Machine Co., Youngstown, will serve as sales representative for Wean Equipment Corp., Cleveland, announce R. J. Wean Jr., president of Wean, and A. J. Wardle Jr., president of McKay. All incoming inquiries will be handled by E. B. James, vice president-sales for McKay.

Inland to Build Conveyor

Inland Steel Co. will build a 1 mile long coal conveyor system at its Indiana Harbor (Ind.) Works. Designed to triple coal unloading capacity, the new system will service coal boats at the blast furnace dock and coal trains. All rail coal unloading at the dock will be discontinued. At times of peak traffic, the system will shorten boat waiting and unloading time to about 8 hours compared with a day or longer at present.

Major equipment orders were awarded to: Chain Belt Co., Milwaukee, for idlers, chains, sprockets, and bend pulleys; Falk Corp., Milwaukee, for reducers; Cutler-Hammer Inc., Milwaukee, for motors and controls. Three companies will supply the 2 miles of belt: Goodyear Tire & Rubber Co. and B. F. Goodrich Co., Akron; and United States Rubber Co., New York.

Alco Opens Laboratory

Spring & Forge Div., Alco Products Inc., Schenectady, N. Y., opened an 8000 sq ft research and quality control laboratory in Latrobe, Pa. The $300,000 facility is equipped with testing and development equipment. Its purposes: Research in steelmaking technology, help to maintain quality control of steel forgings produced in the firm's Latrobe plant, and do quality control work on open hearth steel production and the heat treatment of Latrobe's products.

Buys Oil Equipment Line

Symington Wayne Corp., Salisbury, Md., purchased the assets of the Oil Equipment Div. of Graver Tank & Mfg. Co., Salt Lake City, Utah. The property will be operated as Lang Wayne Equipment Co. Officers of the subsidiary, which will offer petroleum equipment, are: President, C. A. Rodman; vice president and secretary, W. T. Thornton Jr.; treasurer and assistant secretary, E. L. Hickman.

Moline Buys Truck Line

Minneapolis-Moline Co., Hopkins, Minn., purchased the fork lift truck business of Lamson Mobilift Corp., Portland, Oreg. Significance: Expansion of the company's annual volume of material handling equipment by about $3 million.

Crane Co. Decentralizes

Crane Co., Chicago, is decentralizing to integrate five recently purchased companies. Crane has been formed into five groups, each with its own manufacturing, engineering, sales, and control divisions. They are: Industrial Products Group, Chicago; Plumbing-Heating-Air Conditioning Group, Johnstown, Pa.; Crane Supply Co., Chicago; Systems & Control Group (headquarters to be named later); and International Group, New York.

The five firms purchased since

September are: Chapman Valve Mfg. Co., Springfield, Mass.; Pipe Fabricators Inc., East Chicago, Ind.; Swartwout Co., Cleveland; the operating assets of National-U. S. Radiator Corp., Johnstown, Pa.; and Canadian-Pittsburgh Piping Ltd. which has become part of Crane Ltd., Montreal, Que.

Hupp Acquires Valve Line

Hupp Corp., Cleveland, acquired the manual valve operator business of Jones Machinery Div., Hewitt-Robins Inc., Stamford, Conn. Operations have been moved to the Hupp Aviation Div., Chicago.

NEW PLANTS

Dow Chemical Co., Midland, Mich., has opened a new diecasting plant for light metals to be operated by a division, Dow Metal Products Co. The parent firm has selected Kalama, Wash., as the site for a phenol plant scheduled for completion in mid-1961. It will have a capacity of 36 million lb a year. Dow also plans to build a plant to manufacture nylon 6 at Williamsburg, Va., to be operated by its James River Div. The multimillion dollar plant will have an initial annual capacity of 12 million lb of filament yarn and will be completed by late 1961. Dow plans to increase styrene monomer production capacity at its Texas Div., Freeport, Tex., and at its Midland (Mich.) Div.

Norge Div., Borg-Warner Corp., Chicago, will build a plant at Ft. Smith, Ark., for the manufacture of gas refrigerators and other gas appliances, fabrication of appliance components, and development of new products. Cost: More than $10 million for plant and equipment.

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, will build an air separation plant at Tampa, Fla. The multimillion dollar facility will have a daily production capacity of 25 tons of high purity liquid oxygen, as well as liquid nitrogen and liquid argon.

Atlas Engineering Co. Inc., Roxbury, Mass., will construct a 15,000 sq ft electronics plant at Natick, Mass. It will house Atlas Controls Inc. (formerly the Power Supply Div.), a subsidiary of Atlas Engineering.

National Beryllia Corp., North Bergen, N. J., completed construction of a facility at Haskell, N. J., for research and production of beryllium oxide ceramic materials, used in missile, electronic, and nuclear applications.

Curtis Industries Inc., Cleveland, plans to build a $1 million plant and office headquarters in Eastlake, Ohio. The firm produces keys, key cutting equipment, auto replacement parts, and related hardware specialties.

CONSOLIDATIONS

Gorham Mfg. Co., Providence, R. I., will acquire **Pickard & Burns Inc.**, Needham, Mass., subject to approval of stockholders. Pickard produces such things as radar systems and instrumentation.

Electronic Engineering Co., Santa Ana, Calif., purchased **Anaheim Electronics Co. Inc.**, Anaheim, Calif., producer of an electronic program control device. Robert T. Arnold will serve as manager of the Anaheim Electronics Div.

Ex-Cell-O Corp., Detroit, acquired **Optical Gaging Products Inc.**, Rochester, N. Y., and will operate it as a subsidiary.

Faradyne Electronics Corp., Belleville, N. J., acquired **Investment Casting Co.**, Springfield, N. J.

Tool Steel Gear & Pinion Co., Cincinnati, through its wholly owned subsidiary, Sawbrook Steel Castings Co., Lockland, Ohio, has purchased the **Badall Engineering & Mfg. Co.**, Hammond, Ind. In the Sept. 8 issue of STEEL, p. 72, it was stated that Sawbrook Steel purchased the Badall firm.

American Bosch Arma Corp., Hempstead, N. Y., purchased **Tele-Dynamics Inc.**, Philadelphia, producer of airborne transmitting and ground receiving equipment; recording telemetry electronic equipment; and data acquisition and handling equipment.

ASSOCIATIONS

Gray Iron Founders' Society Inc., Cleveland, appointed Eugene M. Hinze as its cost consultant. He succeeds John L. Carter who has been named cost editor of the society's publications.

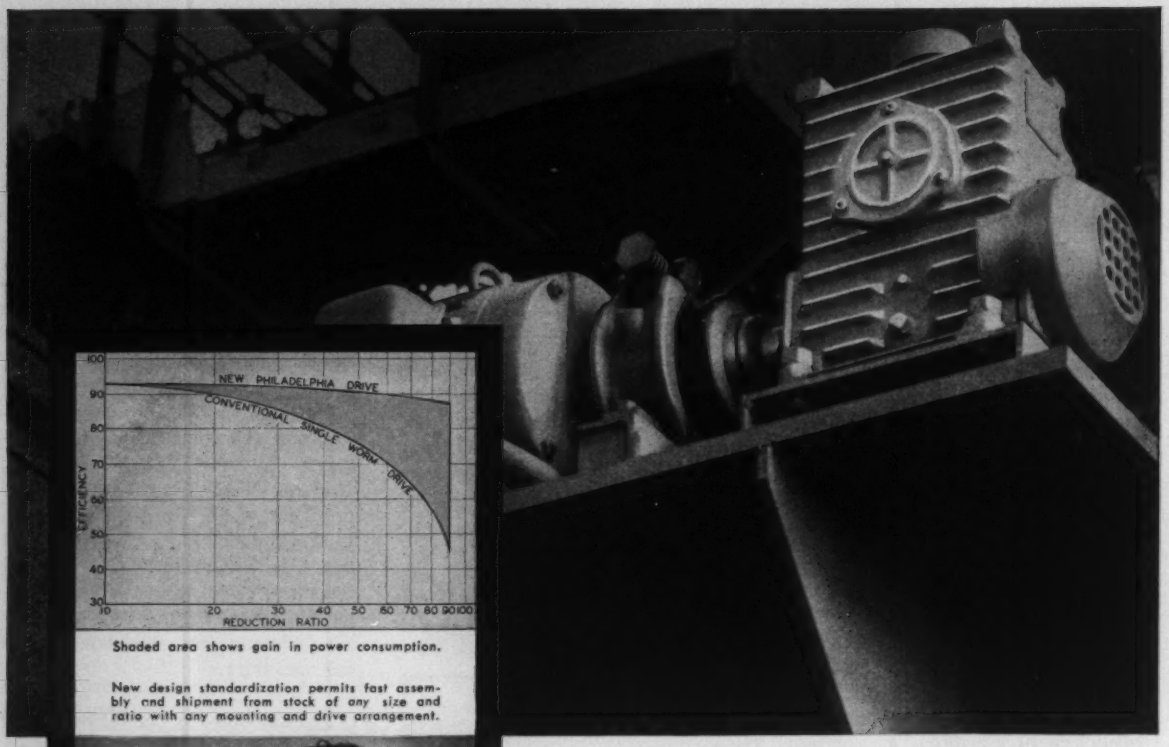
Cutting Tool Manufacturers Association, Detroit, elected these officers: President, G. N. Popham, Gorham Tool Co., Detroit; vice president, K. R. Beardslee, Metallurgical Products Div., General Electric Co., Schenectady, N. Y.; and treasurer, G. E. Johnston, Star Cutter Co., Farmington, Mich. Martin J. Ewald was re-elected executive secretary.

Hiram Brown has joined the staff of **Battelle Memorial Institute**, Columbus, Ohio, as consultant to the department of metallurgy.

Steel Plate Fabricators Association, Chicago, re-elected these officers: President, W. B. Van Wart, Wyatt Industries Inc., Houston; vice president, E. G. Cole Jr., R. D. Cole Mfg. Co., Newnan, Ga.; treasurer, F. E. Seery, General American Transportation Corp., Chicago; and chairman of the executive committee, E. E. Michaels, Chicago Bridge & Iron Co., Chicago.

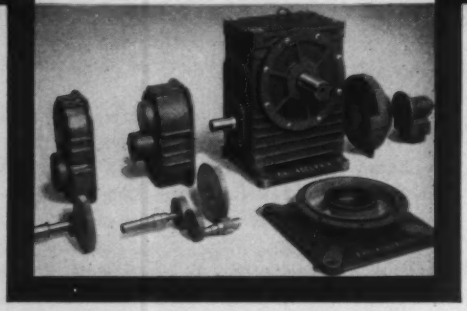
Tool & Die Institute, Chicago, elected these officers: President, Peter Hensperger, Belmont Tool & Engineering Co., Chicago; vice president, Charles Zapf, Charles Zapf & Co., Evanston, Ill.; and treasurer, Paul Prikos, Prikos & Becker Tool Co., Skokie, Ill.

Officers of **Compressed Gas Association Inc.**, New York, include: President, G. C. Cusack, Pure Carbonic Co., a division of Air Reduction Co. Inc., New York; first vice president, D. M. Horner, Harrisburg Steel Co., Harrisburg, Pa.; second vice president, R. S. Passmore, Armour Industrial Chemical Co., Chicago; and secretary-treasurer, F. R. Fetherston.



Shaded area shows gain in power consumption.

New design standardization permits fast assembly and shipment from stock of *any* size and ratio with any mounting and drive arrangement.



NOW get new efficiency new savings in weight and space in worm gear drives

New high efficiency. These new drives offer efficiencies never before available in worm gear drives. Helical attachments for double and triple reduction units combine the efficiency advantage of helical gearing with the high ratio advantage of worm gearing. You save on power consumption . . . operating temperatures are lower . . . gearing lasts longer.

New high capacity. This is not just a re-rated line. Improved tooth forms, precision ground alloy steel worms, special high strength bronze gears, sturdy housings, precision ground helical gearing . . . all mean higher capacity in less space. In fact, you get space savings to 50% . . . weight savings to 60%. Or, you can handle loads up to 80% greater in the same space.

New flexibility. These new heavy duty high efficiency Philadelphia drives have a degree of flexibility never before available. One basic housing design can be combined with standardized horizontal and vertical mounting bases, worm gearing, single and double helical attachments, and fans, for any drive and mounting arrangement in the exact size and ratio to meet your requirements . . . standard or special. Torque control attachments for all sizes are available from stock for applications demanding overload protection. Ratios from 5⅛ : 1 to 1212 : 1. Center distances from 3″ to 21″. Write for catalog information.

PHILADELPHIA GEAR CORPORATION
King of Prussia, Pennsylvania (Suburban Philadelphia)

philadelphia gear drives

Offices in all Principal Cities • Virginia Gear & Machine Corp., Lynchburg, Va.

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

NEW FLUX HELPED— The Navy wanted the submerged arc welds in its submarines improved. They contained too much oxygen, too many inclusions, says Perry J. Rieppel, chief, Metals Joining Division, Battelle Memorial Institute, Columbus, Ohio. A new flux containing less silica and more calcium oxide limited the problem. Welds now have the desired notch toughness and yield strength.

PORCELAIN ON MAGNESIUM— Dow Metal Products Co., Midland, Mich., has a new system which puts porcelain on magnesium to protect it from corrosion and improve appearance. Key: A surface pretreatment that solves adhesion problems.

REDUCING ENGINE RUMBLE— A General Motors study shows that rumble, common in high compression engines, can be reduced by certain phosphorous additives in gasoline or selected types of crankcase oil. Conclusion: Compression ratios up to 12 to 1 are feasible.

CARTVEYOR—Look for new applications to grow out of a supermarket's use of a Link-Belt system that transports customers' grocery carts from checkouts to a parking lot 200 ft distant. The system helped the supermarket, at Joilet, Ill., solve a difficult location problem.

EASING THE BURDEN—A set of mathematical equations that can speed up blast furnace operations by easing computation of charges has been developed. Jones & Laughlin Steel Corp. engineers already have it in use at the company's Aliquippa, Pa., Works.

CONTROLS TO GET SMALLER— Square D Co. says that electrical controls for machinery will get smaller and smaller to save floor space. Added controls required by more sophisticated automation could pose a floor problem for cabinets. The Milwaukee firm also foresees longer life and more reliable circuit continuity which will accompany the miniaturization trend.

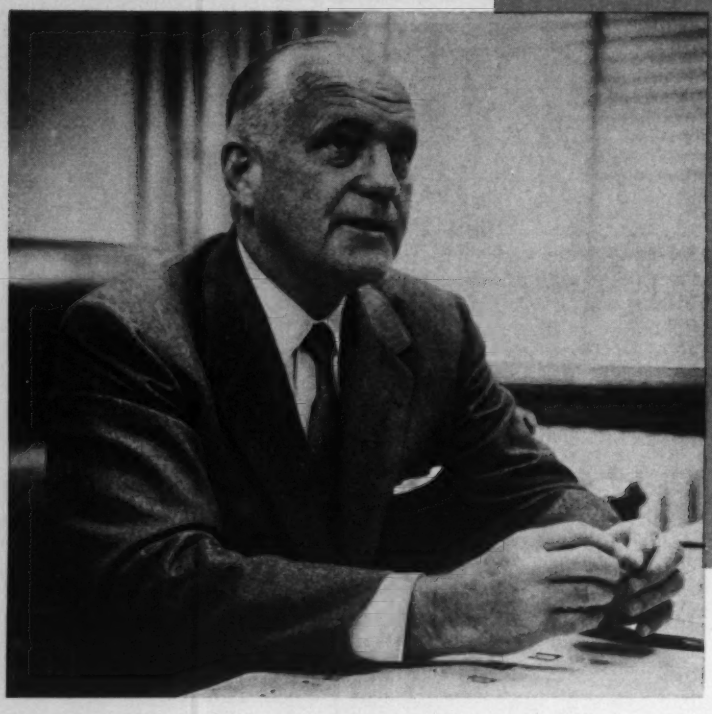
CLOSE MEASURING DEVICE—The National Bureau of Standards, Washington, has worked out a way to measure ball bearings to about 5 millionths of an inch. A high resolution infrared spectrometer designed and made by the bureau can even resolve the minute structure of many molecules. Yet needed, say many bearingmakers: Devices to measure 1 or 2 millionths of an inch on ball dimensions.

80 TON HYDROFOIL— An aluminum ship 104 ft long should be able to travel the open sea at 60 to 80 knots. Plans for the craft are being made by Dynamic Developments Inc., Babylon, N. Y., a Grumman Aircraft Engineering Corp. affiliate. The Maritime Administration has awarded the firm $1.5 million to construct it.

TURBINE POWERED TRUCK— Jet Age powerplants continue to find prosaic applications. One of the latest is in an ore truck which hauls 32 ton loads up an 8 per cent grade. Studies show that such plants deliver more usable horsepower (torque) than piston engines of the same rating, claims General Motors Corp.

METALCUTTING CANNON—Lockheed Aircraft Corp., Burbank, Calif., is testing a modified 20 mm cannon in its continuing search for speedy ways to machine metals. Best speed for a common type of hardened steel is 120,000 feet per minute, say the engineers.

MICRO-WIRE WELDING— That's what Hobart Bros. Co., Troy, Ohio, calls its version of CO_2 shielded welding with 0.020 to 0.045 in. wire. It was developed to cover the needs of sheet metal fabricators. It is also said to be able to readily bridge $\frac{1}{4}$ in. gaps in 14 gage steel.



Customer insistence on high level performance is a prime reason why top executives like GM's Sherrod E. Skinner (left) advocate moves to install such programs. Also, the effectiveness of your efforts may soon have a profound effect on your competitive position

Reliability Concept Is Step Beyond Quality Control

"OUR products have always been reliable. That's no longer enough. We must be able to measure reliability too," says Sherrod E. Skinner, executive vice president, General Motors Corp., Detroit.

His statement sums up what may become one of the most important competitive trends of the sixties—increasing emphasis on and more careful definition of reliability to exploit reputation as a marketing tool.

The target is the customer's mind. Each firm is striving to build reputation through performance and convince the buyer that the product does indeed last longer and can be depended on more than ever before. As J. V. Lester, vice president, Standard Pressed Steel Co., Jenkintown, Pa., puts it: "It's an increasing belief that in industry almost anything is less costly than a customer's complaint."

Reliability is the capacity of a product to do what it's designed to do for a given period. A key staff man is a systems engineer who works for or with a reliability director. Functions and responsibilities may be either line or staff.

• Reliability pays off in decreased service costs, added sales, and a better corporate image. The alternative—no program—could mean loss of business to a competitor who is able to measure and control reliability and can offer a longer guarantee.

Standard Pressed Steel started its program several years ago. "We enjoy the exclusive patronage of some aircraft firms in certain items. We believe that is due to our success in being able to predict and deliver a specific amount of reliability," states Mr. Lester. "It's hard to measure all the benefits, but we believe the position we enjoy is due largely to the reliability image we have created in the minds of our customers."

Motorola Inc., Chicago, offers another case in point.

Two years ago, it found that 80 per cent of the service during the warranty period was caused by faulty vacuum tubes. Its reliability people went into action, turning up the basic causes of tube breakdowns. "Today, our failure rate on tubes is less than a fifth of what it was when the program started, despite the fact that our warranty has been extended to one year," claims Garth Heisig, director of engineering.

Motorola continues to invest heavily in reliability—it destructively tests $20,000 to $30,000 worth of tubes a year. Each lot of incoming tubes for TV is sample checked by an inspector.

• Auto firms were among the first

Ultraprecise ball bearings are checked for reliability at Norma-Hoffmann Bearings Corp. by using them as spindle bearings in precision internal grinding heads. Richard D. Robertson, manufacturing vice president, checks performance record with W. B. Clark, chief customer representative

to adapt reliability lessons learned from military contract experience. They are keenly aware of the sales value of reputation.

Plymouth ads are talking about "the 165,000 miles you don't drive." Implication: The "solid" 1960 Plymouths are designed and built for 200,000 miles—the average driver keeps his car about 35,000 miles.

Ford also has a program to build reputation. An experience with a trim item offers a good contrast between old and new methods. The firm used to inspect trim items before, during, and after assembly on a car, then watch warranty and policy records and service reports. The new reliability team went much farther: It initiated preproduction tests and examined used cars on dealers' lots. The answers led to a thorough upgrading of trim specifications. Rumor has it the switch will cost Ford hundreds of thousands annually, but the outlay is deemed essential.

Explains Kurt Hoffman, assistant director of quality control, Ford Motor Co., Dearborn, Mich.: "We would like the man who buys a three-year-old Ford to be pleasantly surprised to find that his purchase can run another year or two without any major outlay for repairs. That way we can be certain of creating a favorable image in his mind, perhaps leading to a later sale of a new Ford."

Another proponent is International Business Machines Inc., New York. Bruce MacKenzie, manager of research and engineering information, says: "The concept of reliability really works. By any measure you choose, IBM has benefited from its program."

• Another advantage of a program: More accurate placing of responsibility for performance. Here's what a General Motors source told us:

"I believe that the systems engineering (reliability) approach to the design . . . of subsystems can pay big dividends. It can clearly establish vender responsibility for component reliability and eliminate many of our problems with purchased parts."

Another benefit he lists: Quality and cost improvements in manufacturing through designing automatic quality controls into every processing step.

• The place to start, say the experts, is with the design engineer. He is the anchor man in a reliability team.

An important part of the concept is tied up to testing the reliability and serviceability of the finished part before it reaches the marketing stage. That involves the design engineer, says IBM. "Surprisingly, that's not a widely known relationship."

"Reliability starts with design," flatly state Olin K. Smith, chief engineer, and David P. Warner, product engineering supervisor, G. H. Leland Inc., Dayton, Ohio. They say reliability is a function of design, manufacturing control, of manufacturing variables, knowledge of environment, and adequate communication between user and supplier. "We have been using that formula successfully to answer these questions: 1. How can we plan for reliability? 2. Where does it start? 3. What tools are required?"

"The real spadework for reliability must be done in design groups," adds F. Daniel Applegate, project engineer, Convair Div., General Dynamics Corp., San Diego, Calif. He told an SAE group: "Maintaining cordial relations between designer and reliability staff is a problem which can be solved by designating the design supervisors as representatives on staff reliability committees."

• Whether you choose line or staff setups, directors of reliability ought to report directly to the vice president level, most authorities believe.

The G. H. Leland engineers say they prefer a pure line organization, although you can find many successful examples of high level staff and committee rule concepts. Boeing Airplane Co., Seattle, and Sperry Gyroscope Div., Sperry Rand Corp., Great Neck, N. Y., use a reliability committee which reports to the vice president level. Sperry divisions also use a line concept on important projects.

Many General Motors divisions have reliability directors (14 in all). In many instances they either work at the same level as (or absorb) the regular quality control activities.

Reliability directors usually have a big voice in setting corporate pol-

icy for reliability. Standard Pressed Steel says it takes high level of technical competence to define the degree of reliability you want to achieve and to constantly re-examine the results of your choice.

Most firms contacted have a fairly small staff of highly competent people whose main functions are ideas, co-ordination, direction, and supervision of areas, rather than groups.

A final word on responsibility: Don't confuse quality control and reliability, says Sperry Gyroscope. One is an analysis group, the other specializes in monitoring the complete cycle.

• Bearing companies, because of their long relationship with military programs, are keenly conscious of reliability. Fafnir Bearing Co., New Britain, Conn., believes that a large part of reliability rests with the workman.

Fafnir advises: "All the engineering and advance planning are meaningless if you don't also pick reliable men to execute the program. They are the key to production accuracy, and a reliability program must recognize the personality of people to whom pride of workmanship is an important factor."

A similar approach is used by Saginaw Steering Gear Div. of General Motors Co. (below).

• Purchasing agents have an important role to play. They must become familiar with the reliability idea.

Here is an example from Standard Pressed Steel: An extra finish grinding adds 1.3 cents to a fastener price, but it triples fatigue life. A designer can often cut the number of fasteners he specifies when he knows the part has such an improvement in performance. A purchasing agent as well as a designer may well use such yardsticks to justify increased costs.

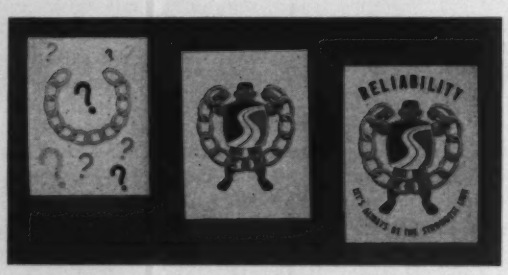
Another way of looking at it: Suppose you have an assembly with 100 critical parts. Increasing the reliability of each part only 1 per cent nearly triples over-all reliability. Of course, the reverse is true—cutting costs might well result in a 64 per cent drop in reliability.

Standard Pressed Steel also claims it would cost only $5 more to equip a car with self-locking fasteners. It claims that 1200 auto accidents in one state in one year were traced to loose nuts and bolts.

George J. Pandapas, president, Electro Tec Corp., South Hackensack, N. J., is a member of the Navy's Bureau of Weapons industry material reliability advisory board. He says: "When someone buys on price alone, he is bound to get into trouble. Higher initial cost to achieve reliability is an investment rather than a cost. Those dollars may be saved many times over in lower maintenance costs."

• Does your product fit the reliability pattern? There are some basic measures you can apply.

How Saginaw Started Its Program



This series of teaser symbols introduced the reliability program to hourly rated workers. A suggestion contest followed

"THE REAL ANSWER to the problem of reliability is the will of every employee to produce a reliable product. Reliability must become a frame of mind with each of us." That's how W. H. Doerfner, general manager, Saginaw Steering Gear Div., General Motors Corp., Saginaw, Mich., introduced his employees to their role in a drive for reliability.

Nine months ago, management at Saginaw started a three part campaign to get their reliability program underway and to get all employees into the act. The division's director of reliability, Harold T. Ross, headed the campaign.

• Step 1—At two meetings, all salaried personnel were introduced to the concept. Its importance was explained in terms of customer satisfaction, company reputation, and profits. Mr. Ross set up an audience participation experiment (see Page 83) to prove that 90 per cent quality in components translates into only 30 to 40 per cent reliability of a ten piece assembly.

Mr. Doerfner explained the goals and told how each department had a key role to play.

• Step 2—Hourly rated workers were brought into the program via a teaser campaign. The first phase: Cards on cafeteria tables, posters, and shirt-pocket tags marked only with a chain and question marks.

After one week, they were replaced by an animated Saginaw trademark (holding the chain ends).

The next week, the words, "Reliability—Let's always be the strongest link," were added to the symbol. It has become the mark of the program and is used on memo forms, posters, and company stationery.

Next, a newsletter was sent to all employees, explaining the concept and calling for help from everyone on the payroll to make the "product we build . . . the best of its kind in the world."

• Step 3—A suggestion contest was initiated. It was designed to dramatize the importance of reliability and to

1. Is your product similar or reasonably comparable to that of several competitors? (Examples: Ford, Plymouth, Chevrolet; Frigidaire, General Electric, Westinghouse, Admiral, Philco. Under such circumstances, reputation for reliability can be a heavy buyer influence.)

2. How big is the gap between your product's present and potential reliability? The comparison may show your need for a reliability program.

3. How much does trade-in or resale value affect your reputation? Reliability may be the key to protecting your product acceptance.

4. How much are you spending on warranty and policy replacements?

• Reliability started with the missile program and quickly spread to consumer product divisions of the big primes. It is rapidly reaching other areas—sometimes because of foreign competition.

Take the chart showing the ratio of reliability to the number of parts (Page 84). If each of Atlas' 300,000 parts had a reliability of 99.44 per cent, you'd never get a single missile on the mark—you need a reliability of 99.99996 per cent to hit the mark nine times out of ten.

Such knowledge has often led to frantic demands on suppliers of components from big primes. Richard D. Robertson, vice president of manufacturing, Norma-Hoffmann Bearings Corp., Stamford, Conn., tells of his experience: "One Saturday, a prime contractor came to us almost in tears—in about six weeks, he would need some bearings, per attached prints. Demands were phenomenal, limits within 5 millionths . . . operating temperatures awful . . . the metals needed weren't even in existence."

Norma-Hoffmann met the deadline.

(It did so with a specially prepared vacuum melted metal and minor customer adjustments).

Such experiences have spurred the development of techniques and knowhow needed to participate in a missile program. "Naturally, much of that knowhow finds its way into our regular production. It forms the basis for a broader understanding of bearing problems as related to reliability," concludes Mr. Robertson.

The testing program at Hotpoint Div. of General Electric Co., Chicago, beats the daylights out of prototypes. Refrigerator doors are slammed and opened 400,000 times with ten times the force normally used—that's equal to 25 years of normal use. Ovens are opened and closed 50,000 times; washers handle 48,000 lb of clothing.

Westinghouse is also well aware of the reliability race. O. L. Taylor, manager of engineering, Portable Appliance Div., Mansfield, Ohio, says: "We have made extensive studies of the reliability of our products. We have started a program to keep abreast of our competitors

start employees thinking positively about their role in the program.

A newsletter mailed to the home (so wives would see it) announced the contest and listed the prizes—home appliances, such as refrigerators, washers, freezers, and stoves.

A new contest is started every three months; the last one will close Aug. 31.

Mr. Ross says that reliability ideas account for one-third of all suggestions turned in. Formerly, practically no product improvement ideas were submitted because most workers felt their suggestion effort should be directed toward cost reduction and safety ideas.

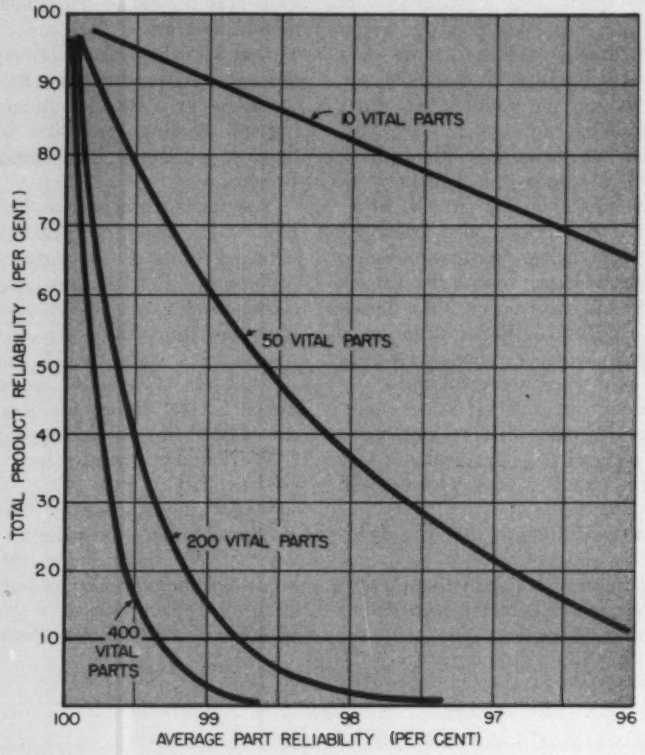
• Direction—A reliability committee, chaired by Mr. Ross, meets about once a month. In attendance: The general manager, works manager, purchasing agent, division comptroller, director of sales and engineering, chief engineer, and director of quality control.

Special emphasis is being placed on design and engineering. Engineers have gone through the entire product line looking for parts that might be assembled wrong. Some have been redesigned to preclude error; in other cases, special checks have been added to catch faulty assembly; sometimes, the only practical way out is to pinpoint danger areas for assemblers and inspectors. All new designs are closely challenged for reliability.

Analysis of field failures has been stepped up too. Service reports are IBM sorted and classified. In addition, a selected group of dealers is returning complete units requiring service to the factory for detailed analysis by reliability and engineering personnel. This gives earlier information on actual field performance than can be achieved from routine field failure reporting.

Mr. Ross adds: "The responsibility rests with all employees. Our reliability group is simply trying to help them do the job better by maintaining continuing emphasis on it."

To dramatize the difference between part quality and product reliability, 100 plastic foam blocks (90 white, 10 red) were dropped into these boxes, nine white and one red per box. The red blocks represented bad parts, so part quality was 90 per cent. Ten Saginaw employees filed past the boxes, took one block from each, and inserted them on a wood dowel. Any assembly with a red block in it was considered bad. In the test, an average of only three or four assemblies are good. In one series, an employee missed a box and finished with only nine parts—proving human fallibility



Reliability is more than a new word for quality control.

Missiles spawned the new science and brought charts like this one into being. It graphically demonstrates the principle that simple machines are more reliable than complex ones.

Scientists and engineers skilled in the mathematics of probabilities can predict within well-defined limits how well each part and each device or assembly will perform. Their scientific crystal gazing is couched in terms called reliability factors.

in the field of reliability."

• **Summing Up**—Traditionally, designers have designed for product efficiency at a competitive cost. Manufacturers have placed great emphasis on quality within those limits. Customers are often thought of as field testers, and engineering and quality control functions counted on their co-operation through a service department.

The era of tighter competition is creating a buyers' market in which customers insist on perfect performance.

Part of that performance will be spelled out as guarantees and warranties. To keep pace, a manufacturer will have to know exactly what he can profitably promise to deliver. Reliability will have to be part of price, performance, and policy. Finally, he will have to watch his competition carefully to see how well he compares with their best.

W. H. Doerfner, general manager, Saginaw Steering Gear, told his employees: "The future of our business and the stability of our jobs depend in a large measure on the reliability of our products. We need to do a lot of serious thinking about how every employee can improve it."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Arc Torch Can Cut Wire Cloth, Expanded Metal

Wire cloth and expanded metal can be cut cleanly and quickly with an arc cutting torch, claims the maker, Arcair Co., Lancaster, Ohio.

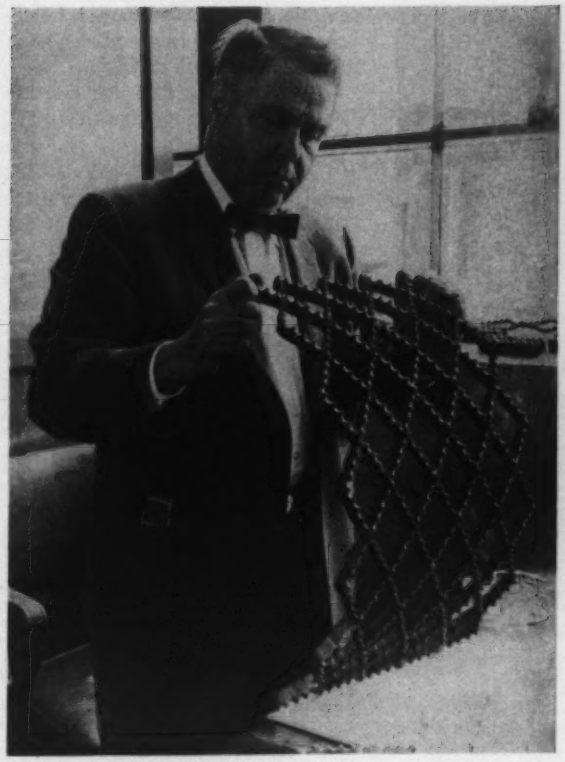
The device handles wire or metal of any thickness or composition. Special jigs, fixtures, or deburring devices aren't needed either, says the firm. Heat input is said to be low enough not to affect metal structure. Preheating isn't used. Cutting is practically instantaneous —either manual or automatic equipment handles such materials at speeds up to 48 ipm.

Arc cutting works equally well on finer meshes and gages and on those above 1/16 in. with no distortion problem. The arc cuts through individual wires without a pause for preheating to take place. Also, arc cutting leaves no burrs and needs no rigid hold-down.

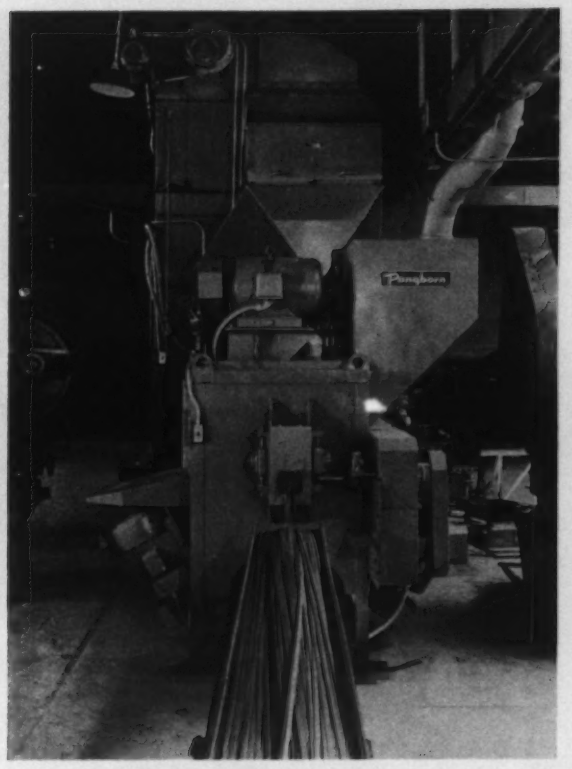
The Arcair torch has an electrode which uses ordinary welding currents and compressed air. Heat from the arc melts the metal. The air blows the molten metal away.

ZIRCONIUM INGOT, weighing 13,200 lb, gets a surface examination at Mallory-Sharon Metals Corp., Niles, Ohio. The ingot was melted from zirconium chunklets produced by the sodium reduction process. Melting of the 30 in. ingot is a significant achievement because the cost of strip and sheet products is directly affected by ingot size

• **Will you win $1000 this month? Read the Servicenter, Page 5.**



Descaled bars (after serrating, forming, and welding) end up as industrial safety grating demonstrated here by Leo Bustin, president, Bustin Steel Products Inc.



Bar stock emerges, mechanically descaled right down to bare metal, on way to automatic serrating, forming, and welding machine

Mechanical Descaler Saves $75 a Day

The method aids automatic forming and welding of industrial grating. All surfaces of hot rolled bars are blasted in one pass at a rate of 180 feet per minute

A MECHANICAL descaler in the production line saves $75 a day at Bustin Steel Products Inc., Dover, N. J., manufacturer of industrial safety gratings.

The saving represents the difference between the daily cost of operating the descaler and the former cleaning expense.

Built by Pangborn Corp., Hagerstown, Md., the machine descales hot rolled bars (3/8 to 2½ in. wide, 0.104 to 3/16 in. thick, 10 ft 9 in. long) directly from stock, eliminating pickling and degreasing.

• **Procedure** — The descaler cleans the stock by hurling 104,000 lb of steel abrasive an hour, blasting all surfaces in one pass at a rate of 180 fpm. Three wheels mounted 120 degrees apart provide complete blast coverage.

The spent abrasive is recovered in a hopper and is moved by a screw conveyor which is an integral part of the machine. The conveyor delivers the abrasive and refuse to an air-wash separator using a stratification principle to remove dust and fine particles. The cleaned abrasive is moved to a storage bin for re-use.

A dust collector exhausing 2100 cfm effectively protects adjacent production operations.

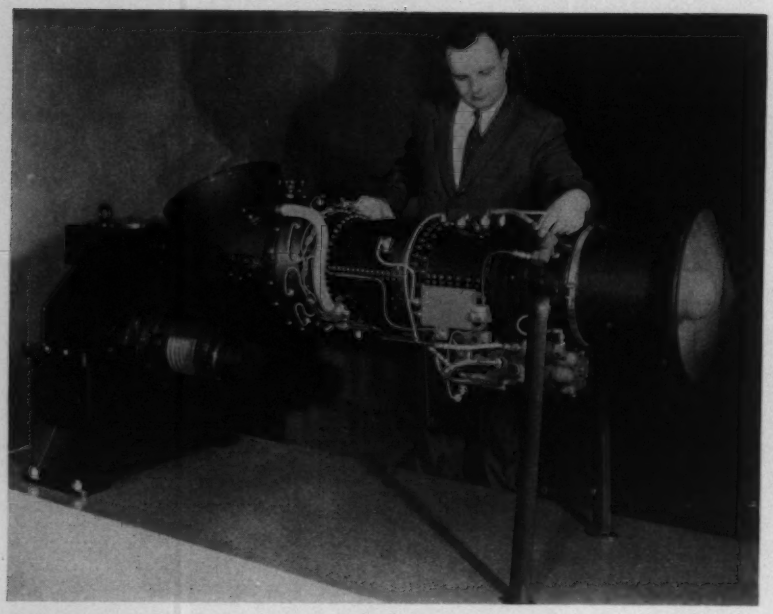
Since fabricating and welding are done in a special automatic machine, precautions must be taken to avoid fouling the sensitive mechanism with scale or rust.

• **Results**—The material is cleaned down to the bare metal. High speed serrating can be done without oil to protect the tools and dies. That results in prolonged operating life.

With the metal completely clean of rust and scale (which act as insulators), a better weld is obtained with less heat.

The alternative to mechanical descaling is the purchase of pickled bar stock. It requires rustproofing with oil and degreasing before fabrication. Oiled bar stock must then be degreased to permit welding.

Only one operator is required. The operation can be completely automated.



Basic weight of the engine is 300 lb. The package (motor and reduction gears) measures 85 by 40 by 28 in., weighs about 1200 lb. Reduction gears at right

Small Gas Turbine Can Do Big Jobs

ARE YOU looking for a small powerplant that packs a big wallop?

General Electric Co. has brought out one that fits into a small space, is easily transportable.

It's a gas turbine weighing only 300 lb (including accessories) that is classed in the 700 to 1000 hp range. Two models are available.

Specifications: Model 720 is a liquid-fuel burning engine (kerosine, marine diesel oil, and aviation gasoline.) Model 722 burns natural gas.

Maximum continuous shaft horsepower for both is 900. Fuel consumption is 11,500 Btu per horsepower hour; thermal efficiency is about 22 per cent.

Uses in industrial and marine fields are being investigated.

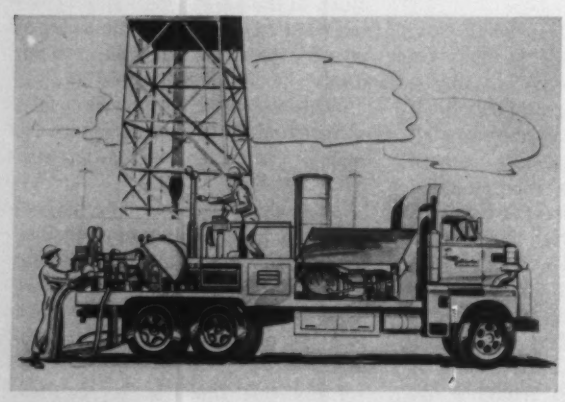
• **Compressor Drive** — Model 722 will be tested as a compressor drive in a natural gas pipeline pumping station. The light, compact unit may reduce the need for skilled, traveling maintenance crews.

The engine, less its reduction gear, can be carried by two men and transported by station wagon. A turbine requiring service can be replaced by a spare with a minimum of downtime. The engine's size also permits construction of smaller, less costly compressor station buildings.

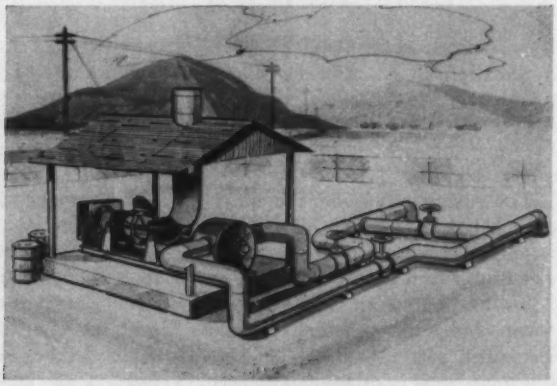
• **Pump Drive**—Model 720 will be tested as a pump drive. It will power a Triplex pump delivering an oil and sand slurry up to 1100 gpm at pressures up to 8000 psi. The drive and motor (a 7 ft long package weighing 1200 lb) occupies only a portion of a truck platform, permitting use of lighter and smaller trucks.

Because the engine needs no warmup period and no cooling run, fuel is saved at both ends of the cycle.

• **Amphibious**—Model 720 is also being tested as the powerplant in two marine craft—a 24 ft, experimental, high speed hydrofoil and a Marine Corps amphibian craft. The landing craft is 29 ft long and weighs 85,000 lb. The turbine is geared to the tracks of the amphibian.

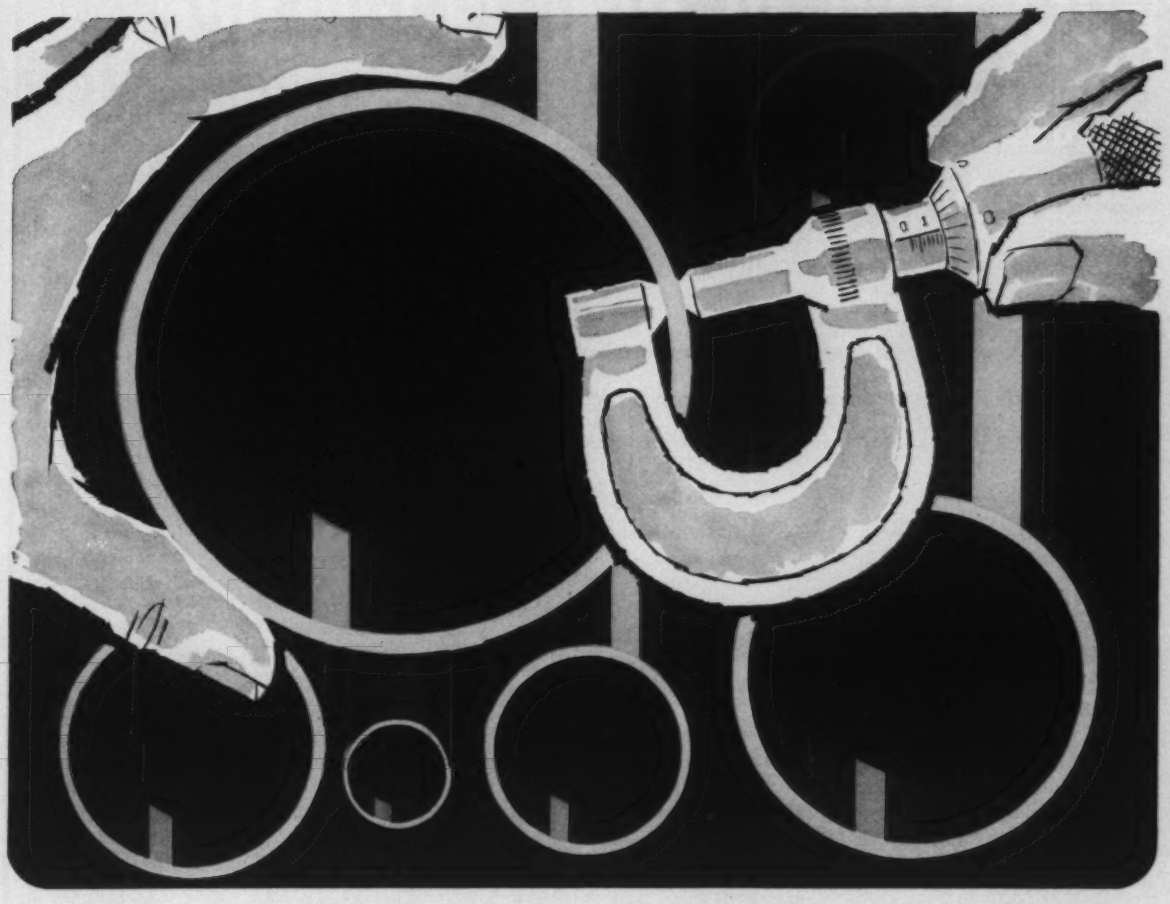


Model 720 illustrated as mobile pumping package for oil fracturing units



Model 722 installed as prime mover for compressor in natural gas line pumping station

Experience *— the added alloy in* ***Allegheny Stainless***



looking for thin walls in big diameters?

A-L now offers a wide range of stainless seamless tubing with walls as thin as .013".

From what other source would you expect to get stainless seamless tubing of 3½" OD with walls as thin as .058" and in the widest range of materials anywhere to fit a broad range of requirements in new products and processes?

Allegheny Stainless Tubing ranges from 3/16" OD to 3½" OD with wall thickness from .013" to .375". Typical of the specials A-L can make are 2½" OD—.032" wall thickness, 3" OD—.042" wall thickness and 3½" OD—.058" wall thickness. All sizes with true circularity, no dents or handling marks.

Stainless seamless tubing is made in all stainless grades including 309, 317, 318, 310, 416 and 446—normally difficult to obtain. For special high-temperature applications, A-L produces tubing in high-strength alloys such as A-286, and in vacuum melted steels and alloys. Also in custom analyses such as low cobalt (.01-.05) grades and with boron additions to standard grades.

A-L also makes composite tubes with bonded combinations of carbon and stainless steels and other metals for unusual corrosion applications in process equipment.

Allegheny Ludlum Tubing is available in small orders in random or cut lengths. Standard grades in stock throughout the country.

Write for your copy of Allegheny Ludlum Stainless Tubing, or call your A-L representative for all the help you need. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. S-261.*

NEW!
FREE—A-L's new book on stainless tubing 32-pages of technical data, sizes, grades and suggested applications.

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EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

How Steelmakers Can Use Oxygen Safely

Many materials ignite easily in the pure gas. Steelmen can minimize fire danger by following these rules:

- **Remove all burrs and scale from oxygen lines; use filters.**
- **Clean piping parts with caustic solution; cap until used.**
- **Identify lines; protect them from oil, mechanical damage.**
- **Post safety instructions where workers will read them often.**
- **Insist on oilfree protective clothing for furnace personnel.**

INCREASING use of oxygen in steel plants calls for a closer look at safety rules, says R. E. Armstrong, project engineer, development laboratory, Linde Co., a division of Union Carbide Corp., Newark, N. J.

Steelmakers can insure safe use of the gas in melting furnaces by deciding on the right handling procedures and observing them, Mr. Armstrong said at a meeting of the National Safety Council in Chicago.

• Use of oxygen in steel production has increased sevenfold in less than 15 years. Old safety measures aren't always adequate.

In 1946, the steel industry used about 3.3 billion cu ft of the gas (measured at 70° F, at sea level pressure). The chief applications were cutting, scarfing, heating, and welding. By 1958, annual consumption had jumped to about 23.8 billion cu ft; it is expected to reach 40 billion cu ft in 1964, or 500 cu ft of oxygen per ton of steel produced. Combustion and metallurgical oxygen for steel furnaces account for most of the increase.

Flow rates through a single orifice have been boosted from 6000 cu ft per hour to about 10,000 cu ft a minute. Pipelines that formerly fed several oxygen-using tools are operated at higher pressures and feed only one outlet. Trouble spots on the lines have increased in number and severity.

Safety fundamentals are often ignored after long periods of safe operation. Safety rules should be posted where workers will read them often.

Separators or strainers in old lines are sometimes removed or bypassed to increase oxygen flow. Some new lines are installed without adequate filters. Small particles of scale or pipe burr, which are no problem in oxygen lines that occasionally feed cutting, scarfing, and heating tools, can cause trouble in lines carrying the gas at high velocities. Particles can be torn free and sent through the line at high speeds; direction changes can cause friction and ignition of oil, rubber hose, or combustible pipe joint compounds.

• Burners and lines used for combustion oxygen must be well designed and maintained.

Oxygen pipe used in auxiliary burners must be cleaned carefully during manufacture and maintenance. Mr. Armstrong recommends caustic cleaning solution but says certain industrial solvents are satisfactory. Burrs and fins must be removed from the pipe before it is assembled. Piping can be tested for leaks at 1½ times its maximum operating pressure with oilfree compressed air or nitrogen.

Flexible metal hose (cleaned thoroughly for oxygen service) is recommended to connect the feed pipe to the burner. Spare hose should be stored in an oilfree area, with ends capped, and tagged "oxygen service."

Oxygen lines should be inspected daily for breaks, leaks, or grease and oil saturation. The main shutoff valve should be locked and tagged while damaged parts are being replaced. Pipe joint compounds should be noncombustible in pure oxygen.

Precautions must be taken to prevent liquid fuel from dripping into the oxygen line. Contamination should be cleaned from the outside of the hose before it is disconnected.

• Door lancing equipment must be stored, used, and maintained carefully.

Iron pipe is often inserted through the furnace door and under the surface of the bath. Oxygen flowing through the lance bubbles toward the surface, helping to lower carbon content and to increase bath temperature for tapping. Lances burn away slowly and can be used only once. A water cooled jet is often used instead, but it is held above the surface of the bath during the blow. Both types of equipment must be kept clean for safe performance. Dirt and scale must be kept out of the oxygen supply pipe and hose. Sintered bronze filters are often used for that purpose.

Provision should be made to stop oxygen flow in an emergency.

Mr. Armstrong recommends storage of oxygen hose in a clean, well ventilated area. It also should be coiled. A 45 degree, nonferrous elbow, used between the oxygen hose and lance, will relieve bending strain. Storage racks for cleaned and capped lance pipe can be built near the furnace, in an area free from crane oil drippings and protected from mechanical damage. Lance pipe should be removed from storage only when it is to be used; the furnace helper should inspect the pipe before it is attached to the oxygen line. Pipe used briefly and withdrawn from the furnace should be scrapped.

Water cooled lances must be kept above the surface of the bath. Violent eruptions can occur if the lance tip is damaged and water is forced under the molten metal.

• Safety rules must be followed in

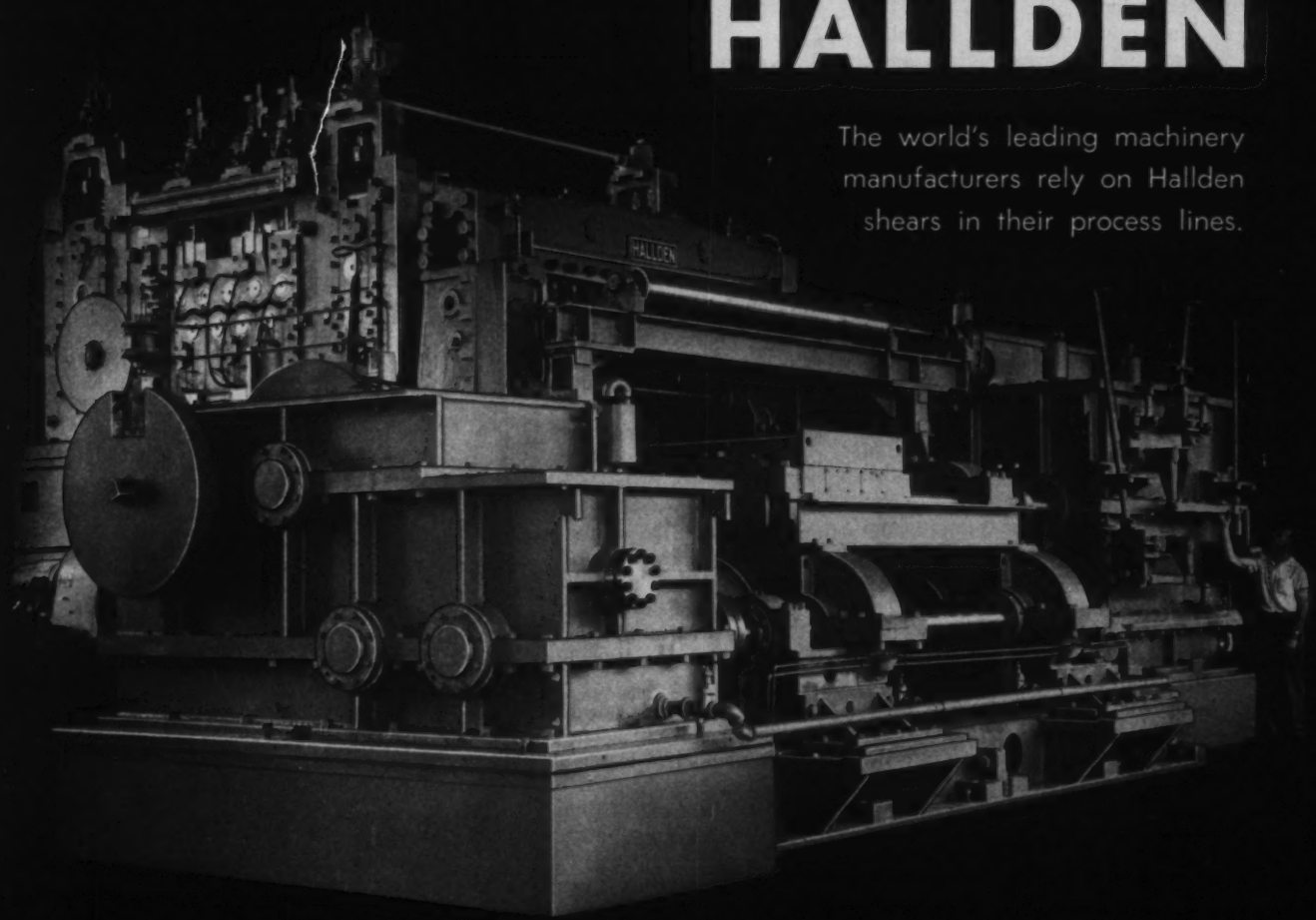
550,000 POUNDS OF PRECISION

The Guillotine Shear's superior cut on heavy gauges, synchronized on the fly

Another Hallden First — type 76 Guillotine Flying Shear, the world's largest, for continuous strip shearing — up to 5/8" thick, 100" wide aluminum — at ***two cuts per second.*** This new Hallden installation can cut mild steel up to 3/8" thick and 90" wide, with cut lengths infinitely variable up to 48 feet. Change of cut length and synchronization may be made while the Shear is in operation. For every high-production shearing application consult the shearing specialists.

HALLDEN

The world's leading machinery manufacturers rely on Hallden shears in their process lines.



THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England

the installation, use, and servicing of open hearth roof jets.

All general rules for safe handling of oxygen must be followed. If lubrication is needed, only lubricants approved by the equipment manufacturer should be used. Teflon valve seats and gaskets are often used on jet equipment; O-rings are often made of Neoprene.

Platforms with closed sides will give workers an escape path on the furnace roof. The expanded metal floor of the platform is usually 4 to 6 in. above the furnace roof; graphite between the roof and platform is blown off periodically, or removed with a vacuum.

Bronze or stainless steel service hose is recommended for the jets. Obstructions, such as quick disconnect valves, are to be avoided.

A mechanical stop and a safety chain will keep the jet from falling into the bath; cooling water pressures up to 100 psi could force water under the molten metal and cause an explosion.

Hose connections must be isolated from oil drip areas under cranes; heavy metal posts or shields can be used to protect the lines from runaway supply cars or hot metal cars.

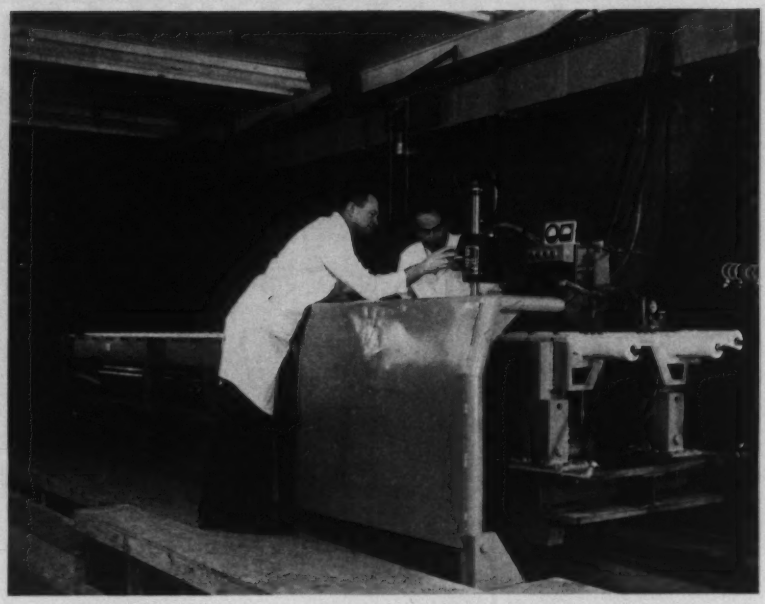
Control panels should be well ventilated where oxygen lines run to regulators and meters; lines should be tested periodically for leaks.

Operators must keep jets above the metal bath (heads can be lowered safely below the slag surface). Jets are usually withdrawn when additions are made at the door in front of them. Bricks can be torn from the roof, and water can be sprayed in the bath if the jet is hit in the charging pass.

Personnel should stay away from the front of the furnace during lime and ore boils. Sample taking, dolomite gunning, and other repair work can be done safely when the heat is being decarbonized.

Jet maintenance work should be done from the roof platform when possible. In most cases, fuel is reduced and scrap is charged into the furnace when workers are on the roof.

Replacement jets can be prepared in advance to minimize piping work on the roof. Jets should be stored where they won't be damaged, with service connections sealed.



Automatic welder completes 20 ft seam in 10 minutes. Operator checks shield on Airco welding head which provides topside protection. Air clamps are used to hold parts in alignment

Lathe Bed Makes Ideal Welder Base

IF YOU must join thin parts accurately, you will be interested in the way Atomics International Div., North American Aviation Inc., Los Angeles, made a welding machine for such work.

The firm used the bed of a large gun drilling lathe as a sturdy base for fixturing and shielding.

The results: A seam dimension can be held to within 0.005 in. over a 20 ft length. In a few instances, accuracy is greater than that.

• The division needed a way to accurately weld a 20 ft long moderator and reflector assembly for an atomic reactor.

Such assemblies, called cans, are usually made of a corrosion resistant metal like zirconium which needs an atmosphere on both sides of the joint during welding.

The gun drilling lathe was formerly used on artillery weapons. Its 40 ft bed is big enough to accommodate interchangeable tooling, a plus feature created by designers Leo T. Bogaert and Joe Faitel who expect it will add greatly to future savings.

The fixturing clamps the sheathing stock on a horizontal backup bar which is grooved to hold shielding gases against the underside of welds. The work and fixturing travel the lathe ways past an Airco welding head at any of a variety of rates of speed. Only one man is required to set up and operate the equipment. Two are normally used to speed loading and handling.

A heavy lathe bed such as this has the necessary rigidity and strength to prevent warping during welding and to maintain tight tolerances in light gage stock. Rigidity also permits movement with a minimum of vibration—ideal conditions for welding.

The metal must also be protected from scratches, dings, and similar defects which are reasons for rejection at final inspection.

Regular shop personnel have been trained to operate the machine.

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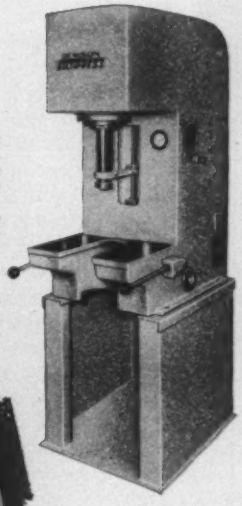
in new cost-reducing series
of DENISON "R-S-T"
hydraulic bench presses

NEW PRESS



NEW "R-S-T" SERIES MULTIPRESS . . . versatile cost-reduction tool on small lots or high production runs. Standard accessories available to increase productive capacity.

FREE BULLETIN . . . write for your copy of our 8-page specification and application Bulletin 324.

NEW PRESS series is designed to cut costs on your toughest production jobs. Here are the key advantages built into this new, ultra-efficient line of presses.

Produces more pieces-per-hour . . . 65% faster approach. Faster return speeds on the hydraulic ram give you more cycles-per-minute.

Simpler to tool . . . there's more daylight to mount tools for manual or automatic production.

Faster to set-up . . . new, quick, simple adjustment now sets position of ram in seconds. And you can "inch" the ram to the work under set pressure. Closer control of ram pressure is quickly attained with a newly-developed relief valve.

Handles wider range of work . . . ram stroke has been doubled for greater tool clearance for long, deep work.

Easier to operate . . . there's more knee room for operator convenience.

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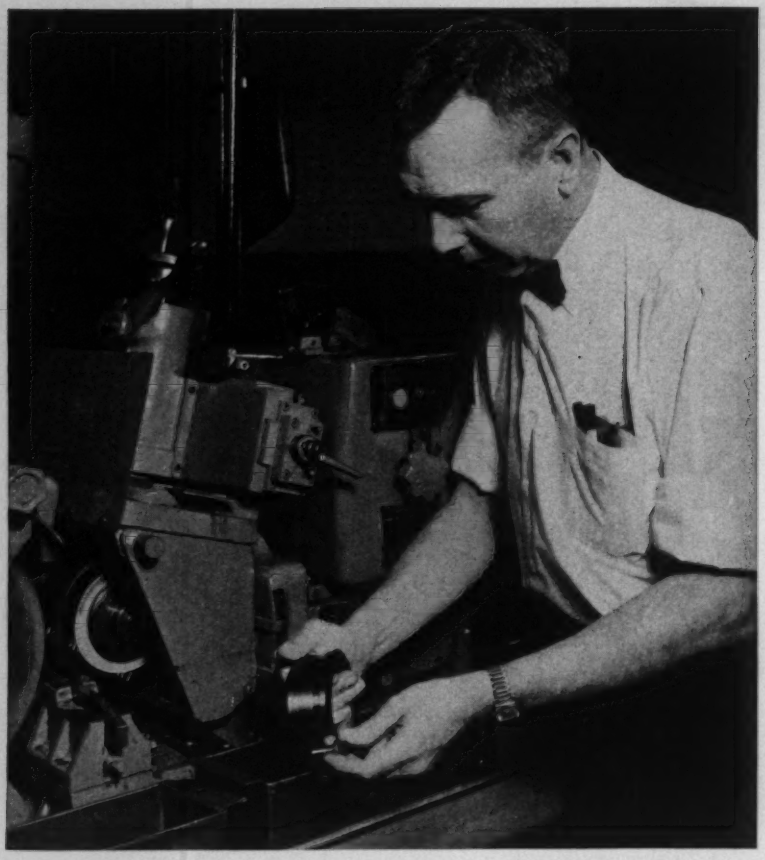
Crush Dressing Pays Grinding Dividends



Syd Matthews, machine tool analyst, shows how a ground fastener compares with the master roll used to dress the grinding wheel in this Van Norman centerless grinder

PRODUCTION men at Standard Pressed Steel Co., Jenkintown, Pa., often turn to a centerless grinder with crush wheel dressing to help them solve problem jobs.

One of their continuing challenges: To produce fasteners having complicated shapes with extremely close tolerances and fine finishes.

Many of the parts are best suited to finish grinding by centerless or cylindrical grinding, or a combination of both.

Before centerless grinders with the added crush dressing feature were installed, many of the jobs were costly to produce. In some instances, they were economically impossible.

• Crush wheel forming opens up a variety of opportunities to cut finishing costs.

SPS expects one or more of these benefits:

1. Faster metal removal rates due to sharper wheel grain.
2. Better repeatability from piece to piece.
3. More parts ground between wheel dressings.
4. More complex forms can be produced in one operation.
5. Closer tolerances and fine finishes are possible.
6. Less setup time is required on repeat orders.

• Since crusher rolls can be expensive, the method is used only after a cost evaluation justifies it.

One master crusher roll is made of high speed steel. It is mounted on the centerless grinder and is used to form the grinding wheel by feeding the roll into the wheel with uniform pressure.

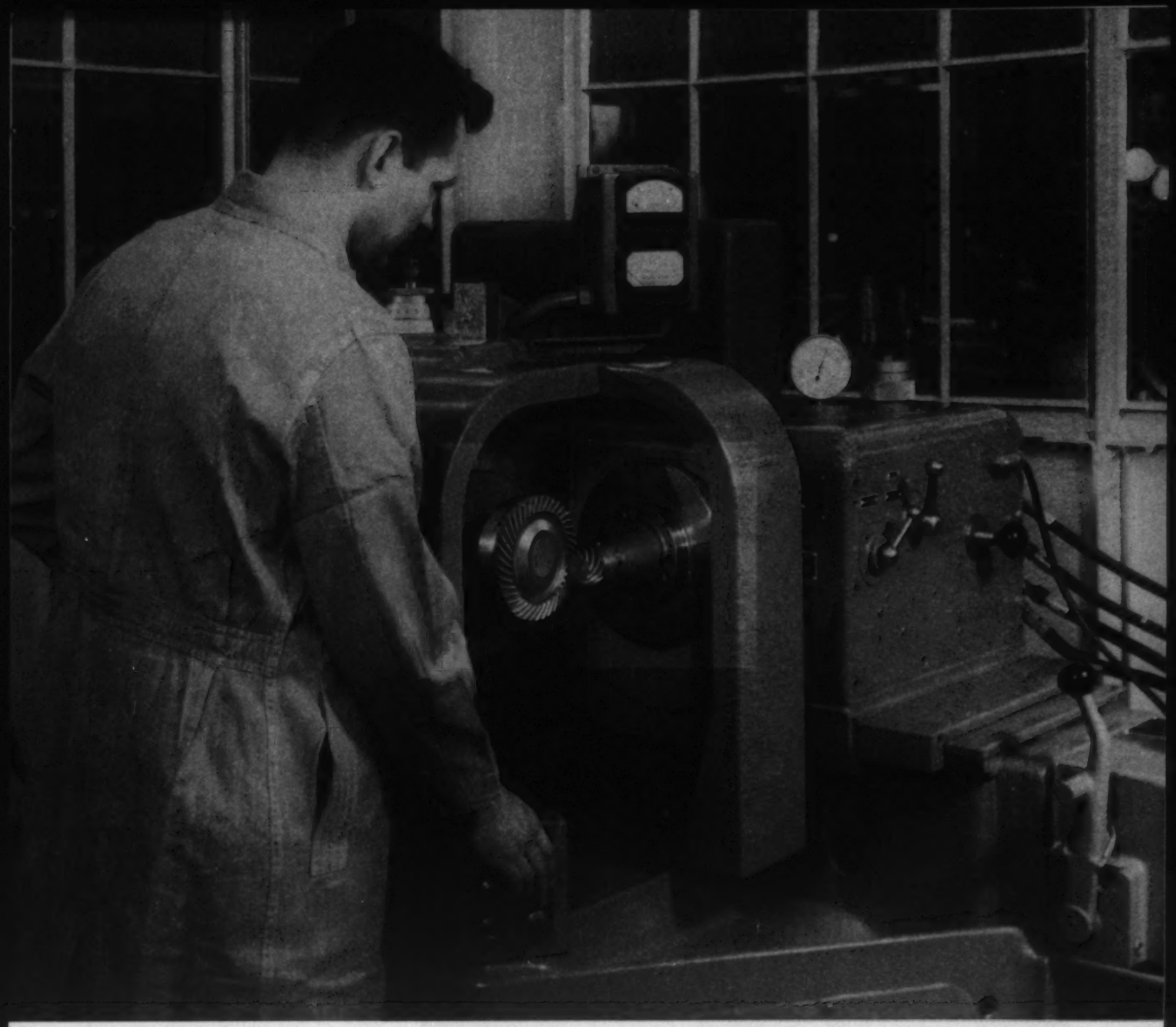
Often, more than one master roll and a work roll may be needed. The form initially crushed in the wheel can be used to reproduce the form on any number of roll blanks. It is done by slowly revolving the roll on its spindle and increasing the grinding wheel speed.

A work roll, mounted in the grinder, reconditions the grinding wheel whenever necessary. At SPS, work rolls withstand about 15 crushings before they are out of tolerance. Then the master roll is used to re-dress the wheel, and the wheel in turn reshapes the work roll.

• Five factors can contribute to the economy of crush grinding.

1. The major saving in crush dressing is attributed to the combining of several operations (usually center type grinding jobs) into one. SPS spokesmen say it is not unusual to realize a saving of 15 to 25 cents a grind.
2. Long turns on lathes may be replaced with one crushed form hogging operation.
3. Straight shoulders, necks, and steps that are otherwise impossible to dress in a wheel, can be done easily. "We can now make the parts with a saving that our customers can realize in their purchase price. We are selling many of the jobs at 25 per cent below the price of two years ago," says SPS.
4. Wheel and diamond savings, plus the elimination of the cam required for single-point dressing, pay the cost of grinding crusher rolls.
5. There is an additional saving of about 20 per cent because a crushed wheel permits grinding about 20 per cent faster. Also, it is not unusual to get 2500 parts ground before the wheel requires redressing.

The method is no panacea for grinding, warn the experts. Each job is different.



Now you can *speed-test* gears up to 4000 RPM

Since the accuracy of any gear test depends on how well it simulates actual operating conditions, we've developed a hypoid tester with speeds up to 4000 RPM. The higher range of speed on the No. 17A-4000 Hypoid Tester makes possible a new standard in the testing of bevel gears.

Complete testing on one machine. The No. 17A-4000 Hypoid Tester is arranged for both power and slow rolling tests. With the power test you can observe a gear's smoothness of operation, its noise characteristics, and its tooth contact pattern.

Roll test the gear and you get accurate readings of its eccentricity, tooth size, spacing, and profile.

With the No. 17A-4000 Tester you can test any right angle straight bevel, Zerol® bevel, spiral bevel and hypoid gear of any pitch and up to 20″ OD.

Pre-set backlash control. The No. 17A-4000 Tester has a new hydraulic backlash control mechanism. The control automatically duplicates your pre-set backlash value when you change the relative positions of a gear pair to simulate actual operation.

Exact duplication of settings. Indicator set-up fixtures are available for large quantity testing. With these gages you can make identical settings on a battery of machines, or get the same setting repeatedly on a single machine.

New bulletin. We've prepared a bulletin on the No. 17A-4000 Hypoid Tester to answer any questions you might have about its construction or operation. Write for a copy.

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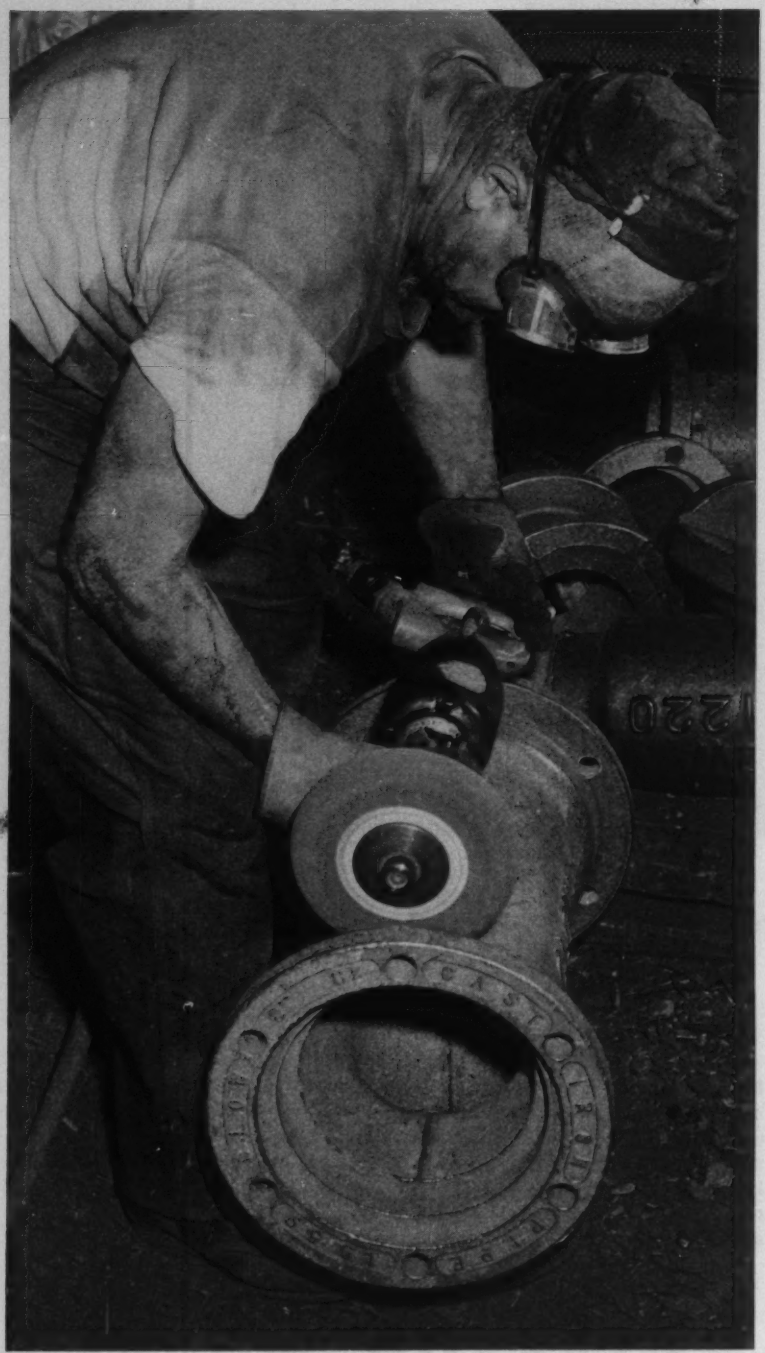
Hand Tool Replacement Nets $6870 Annual Return

A program which relates wear to efficiency can pay for new tools many times over



Cost analysis of a snagging operation like this one resulted in a replacement plan for hand air tools which increased production 8 per cent. Return on investment: 600 per cent

INCREASES in hand tool efficiency averaging 30 to 40 per cent were the benefits of a step-by-step analysis of portable air tools by James B. Clow & Sons, Coshocton, Ohio, and Ingersoll-Rand Co., New York.

The study showed, for example, that a new tool cut grinding time on the bell end of a 6 in. cast iron pipe by some 60 per cent; on a 4 in. pipe, the improvement was better than 50 per cent.

It takes little engineering time to cash in on such a program, declares Ingersoll-Rand. A technique it developed simplifies such studies.

• The first step in checking possible savings is to find out how many tools are being used and their average age.

Ned Patterson, a standards engineer at Clow & Sons, and Don Quigley, an air engineer for Ingersoll-Rand, made the studies. They point out that the real value of a portable tool must be measured in terms of the ability of an operator-tool combination to produce. And the relatively low tool cost is less significant than the labor charge. A simple analysis shows what Clow & Sons has achieved with planned retooling (see table).

An average payroll for 15 operators would run about $68,700 a year. Only tool use time can be counted as a potential dividend. In this case, it turned out to be about 50 per cent (as it is in most iron and steel foundries which use grinding and chipping tools). Figuring on a 20 per cent production increase, the potential dividend gain was $6870 (payroll, times 50 per cent usage, times 20 per cent).

To keep air tools at top efficiency, claims Ingersoll-Rand, you need to replace them at regular, planned intervals—it figures tool life in foundries varies from two to ten years.

How to Figure Replacement Payoff

Here is how Ingersoll-Rand Co., New York, calculates the return on investment from planned replacement of portable air grinders. Assumptions: Company has 15 operators using the tools; their average annual wage is $4580; tools are used only half the time; 25 per cent of the tools should be replaced each year at an average cost of $250; planned replacement will bring a 20 per cent production gain (based on a time study).

Wage paid for tool use: $34,350
(15 operators x $4580 x ½ time)

Annual replacement budget: $937.50
(15 tools x 25 per cent x $250)

Potential dividend on a $937.50 investment: $6870
(20 per cent x $34,350)

Replacement Rates

	Use Factor (% per manday)	Maximum Tool Life (Years)	Recommended Replacement Rate (% of tools per year)	Average Tool Cost ($)
Chippers	50	2	50	150
Grinders	50	4	25	250
Rammers	10	10	10	225

• The retooling rate is based on life expectancy. If it is four years, a 25 per cent replacement factor is adequate.

Clow & Sons' replacement budget is $937.50 at that rate. (Average grinder cost is $250.)

Many firms favor an expenditure if it pays for itself in a year. Clow required a 2.7 per cent production increase to achieve that. Based on the time studies made, Ned Patterson estimated grinding time would be decreased 40 or 50 per cent.

Most union contracts call for retiming when a new tool is installed. At Clow, the standards department reduced chipping and grinding standards 29 per cent.

Over-all reduction on standard elements for the entire production of cast iron fittings was 8 per cent. Actual output was boosted 8.7 per cent—more than three times the increase (2.7 per cent) required to pay for the replacement budget.

Clow reports it liked the program so well it bought twice the number of tools required to get a good start.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Induction Heater Ups Productivity by 30%

Brazing of carbide tips by induction heating increased productivity by 30 per cent at Virginia Tool Co., Bassett, Va.

Using a General Electric high frequency heater, the firm carbide tips saws, router bits, and other cutting tools.

Brazing takes about 45 seconds. Example: A saw blade is put in a jig, soldering flux applied, and the carbide tip placed against a tooth. The heater is turned on. Maximum heat is reached within 25 seconds and held for 10 seconds. The heater is turned off and the tooth permitted to cool for 10 seconds. The cycle is repeated for the next tooth.

Quality has improved, comments V. G. Bryson, manager of the tool firm. Difficulty in heating the work area uniformly was encountered with the previous brazing method. Result: Stress and eventual cracking of the carbide tips because of differing coefficients of expansion in steel and carbide.

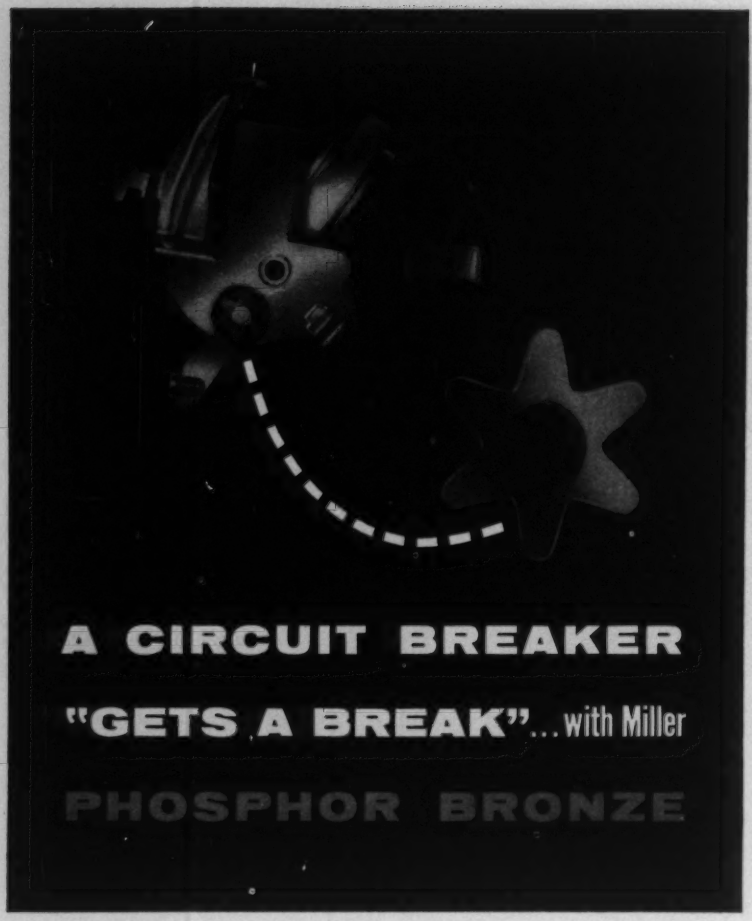
With induction heating, brazing is accomplished without oxidation of the carbide tips.

Feeder, Scrap Separator Raise Salvage Profit

A vibratory feeder and a magnetic separator increased metal salvage profits at Miehle Co., a division of Miehle-Goss-Dexter Inc., Chicago. Plant officials say the installation will pay for itself in about one year by separating ferrous from nonferrous scrap.

The system has a hopper over an Eriez Hi-Vi vibratory feeder and an Eriez permanent magnetic agitator type drum. Particles such as shavings, borings, and chips are dumped into an overhead hopper and are then automatically face fed (at controlled speeds) against the revolving magnetic drum.

The drum's magnetic action picks up the ferrous material and a revolving cylinder carries it to a chute. The nonmagnetic scrap falls from the feeder tray into another chute. The vibratory feeders and magnetic drums were supplied by Eriez Mfg. Co., Erie, Pa.



Design engineers for a leading manufacturer of circuit breakers specified phosphor bronze in the star spring of the circuit breaker shown here. Ordinary phosphor bronze was used, but spring pressure wasn't uniform, and breakers often failed to open under an electrical overload.

Miller—whose specialty is phosphor bronze—experimented with various alloys and tempers for the phosphor bronze spring until they came up with the right material for the job. They specified Miller Grade A Phosphor Bronze—a material that met the rigid requirements for the job . . . was highly corrosion-resistant . . . and was *less* expensive than the phosphor bronze originally used!

Only specialists in phosphor bronze like Miller can get to the bottom of your application problems so quickly.

miller

ROLLING MILL DIVISION
THE MILLER COMPANY
MERIDEN, CONN.

. . . WHERE PHOSPHOR BRONZE IS THE MAIN LINE—NOT A SIDELINE

Toro Process Hard Coats Aluminum Parts in Minute

A fast, hard aluminum anodizing process developed by Toro Mfg. Corp., Minneapolis, provides a surface coating one thousandth of an inch thick in 1 minute.

The process operates at an electrolyte temperature of 70° F. Where other methods employ current densities between 25 and 100 amperes per square foot, the Toro system is able to multiply this level 20 to 40 times.

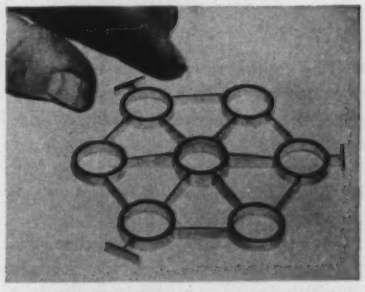
The key, reports Toro, is the system's ability to utilize high current densities without "burning" the aluminum. The coating rate of 1 minute compares with 10 to 50 minutes required by conventional methods.

Because of the brief exposure to electrolyte acids, the coatings produced are light in color—silver gray to medium gray. The lighter coatings make dyeing possible in a wide range of colors.

The purpose of hard coating is to electrochemically produce a film of aluminum oxide able to resist abrasion, and provide a low friction surface when ground. Hardnesses attained are in the range of diamonds, sapphires, and rubies.

Toro expects the process will extend use of hard-coat aluminum to such items as helicopter blades, pistons, gears, architectural components, kitchen utensils, automotive and other parts.

The company plans to make the process commercially available.



SEPARATOR for atomic reactor fuel cluster rods used to be machined from Type 302 stainless. Now 25 simple stampings and screw machine parts are brazed together with a nickel-base alloy in a dry hydrogen furnace. Result: Material and manufacturing costs were reduced 70 per cent

Spray System Applies Plural Component Materials

PLASTICS and other plural component materials that require intimate mixing just before application can be applied without waste of time or materials with the Binks Turbulator and Formulator units.

The development makes possible continuous, fast, and efficient spraying of polyesters, epoxies, gel coats, foam-in-place plastics, and other materials.

Most plural component materials set up or harden quickly when the activator, catalyst, and resin are brought together. Conventionally, the materials have to be prepared in small quantities and used immediately. In the Binks unit the elements are mixed in a spray gun as the material is applied.

The Formulator separately proportions the reactive ingredients and transfers them to the Turbulator gun which can be used to fill confined areas (as when using foam-in-place plastics) or to spray on coatings.

Binks sees the system being used on linings for storage tanks; coatings on many types of surfaces such as structural steel, building panels, and aircraft and missile parts; structural resins used in making boats, swimming pools, furniture, and appliances; and plastic foams for use as refrigeration or thermal insulation, sandwich structures, and cushioning.

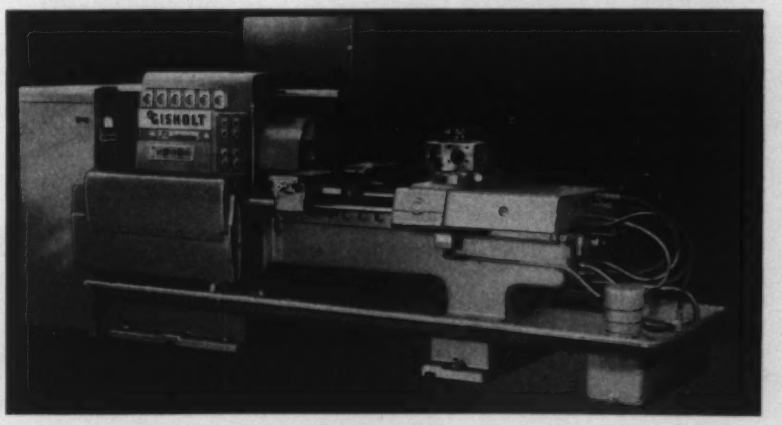
For further information, *write* Binks Mfg. Co., 3114-44 Carrol Ave., Chicago 12, Ill.

Automatic Turret Lathe Takes Less Setup Time

THE ELECTRICAL panel on the Gisholt 3F lathe has trimmed 50 per cent from the setup time required by earlier models by permitting preselection of machine functions and speeds. The panel, equipped with toggle switches, is standard equipment.

Human error is eliminated with this automatic unit. An operator is required only to chuck the work, start the cycle, and remove the completed part, freeing him to handle additional machines.

A new meterout hydraulic control system permits preselection of



feeds for each hexagon turret station. Gisholt says the setup method permits preselection of all feeds and speeds in less than 15 minutes for most work. The setup man's job is reduced to actual tool setting and the normal trial cuts.

For further information, *write* Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.

Self-Fluxing Alloys Ease Brazing Problems

DIFFICULT ALLOYS such as aluminum and titanium bearing metals can be brazed in hydrogen and argon atmospheres with Nicrobraz self-fluxing alloys. They can also be used in other brazing applications where the atmosphere is marginal. Addition of the vaporizing flux does not change alloy specifications or properties and has no effect on joint properties.

The vaporizing flux in the new alloys gives optimum wetting and flow by cleaning the base metal ahead of the alloy wetting range. The flux doesn't attack the base metal and leaves no residue. The self-fluxing materials use the same application techniques and brazing cycles as the conventional Nicrobraz line of brazing alloys.

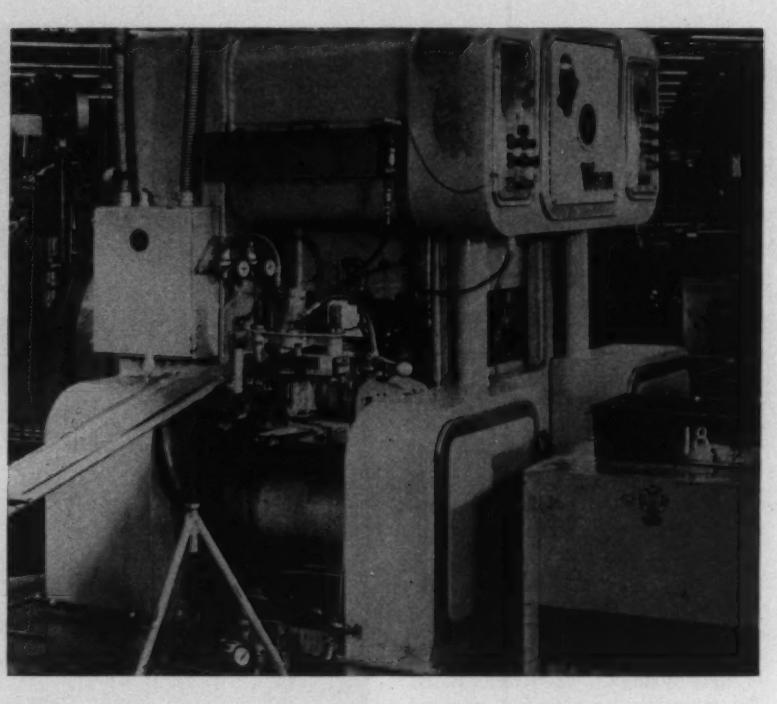
For further information, *write* Stainless Processing Div., Wall Colmonoy Corp., 19345 John R. Street, Detroit 3, Mich.

Barrel Finishing Machine Available in Two Sizes

CAPACITY and precision control for finishing, deburring, and polishing large parts are cited for the Model V36 barrel finishing machine. You can choose from two barrel sizes (36 x 48 in. or 36 x 64 in.) with up to 40 cu ft capacity. One or two compartment barrels are available. Tumbling rates can be adjusted from 7 to 21 rpm.

A Rampe belt and gear power transmission provides smooth starts and stops and quiet operation with reduced stress. The unit has a magnetic brake motor (with remote control) and overload protection.

For further information, *write* Rampe Mfg. Co., 14915 Woodworth Ave., Cleveland 10, Ohio.



Gearless Press Reduces Backlash

A HIGH SPEED flying press without gears in the drive mechanism has been introduced by Wean Equipment Corp. The original design solved a production problem at the Westinghouse Electric Corp. plant at Beaver, Pa.

The press enabled the plant to blank steel magnet and armature core laminations at double the previous rates (tolerances: 0.0003 in.)

Three widely separated crankshafts drive a rotating frame in which the upper die is mounted. The crankshafts are joined by solid connecting rods rather than by gears or chain linkage. The manufacturer says that cuts gear design and production cost, reduces noise and backlash, and prevents multiplication of inaccuracies by a gear train or chain and sprocket linkage.

Both dies (and stock) are in constant motion. The upper die travels in a vertical circle and the lower oscillates through a vertical arc that harmonizes with the circle. The shearing, blanking, or forming action occurs when the upper die reaches its low point and the lower die reaches the peak of its arc.

For further information, *write* Wean Equipment Corp., 22800 Lakeland Ave., Cleveland, Ohio.

Unit Lifts, Tilts Coils Weighing up to 30,000 lb

A COMBINATION lifting and tilting mechanism for steel, aluminum, and brass mills, and warehouses is designed for 5000 to 30,000 lb coils. It can be controlled from crane cabs or from pendant controls. About 45 seconds are required to lift and tilt from vertical to horizontal (or back again).

The holding mechanism is powered by an electric motor through a gear reducer. This applies an initial grip through one wall thickness of the coil. Self-gripping shoes prevent the coil from dropping during changes in position. When the coil is lifted, the turning mechanism is operated by a worm gear

Once upon a time we just built Heat Treating Furnaces. Continuing experience in this fundamental application of heat to industry led naturally to our development of other types of industrial heating equipment—Melting Furnaces, Ceramic Kilns, High Frequency Units, Atmosphere Generators, Pilot Plant and Laboratory Equipment. Today it is pretty well known that, however a product needs heat, there is Lindberg equipment to best apply it. This broad background privileges us to offer industry—

A PLUS DIMENSION in LINDBERG SERVICE

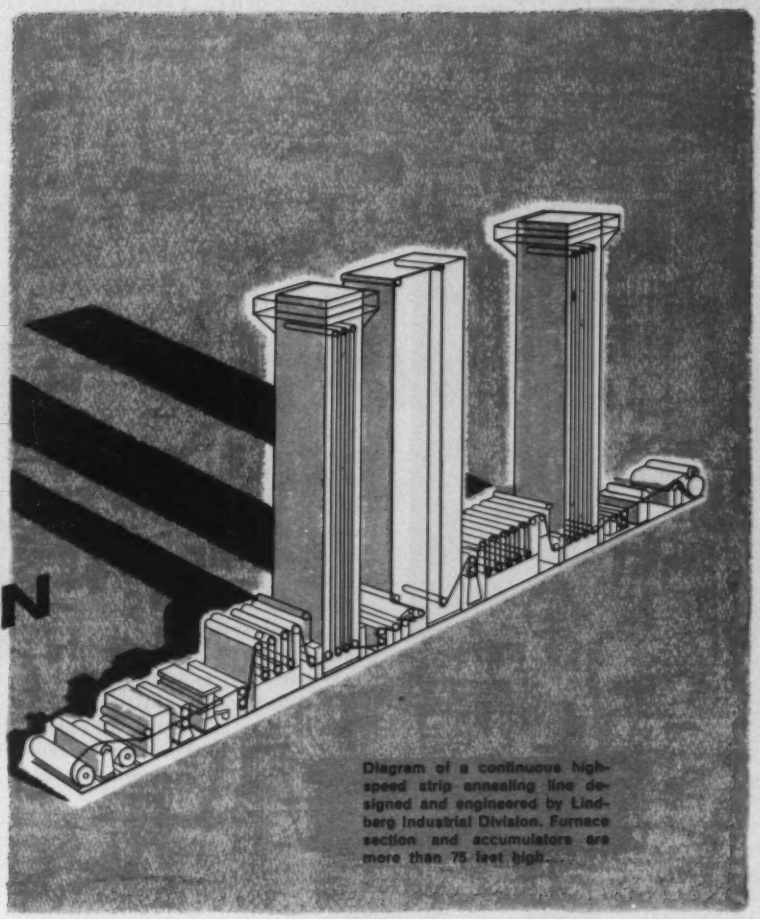


Diagram of a continuous high-speed strip annealing line designed and engineered by Lindberg Industrial Division. Furnace section and accumulators are more than 75 feet high.

We are more than the mere builders of equipment. Lindberg offers today a complete answer to any problem requiring the application of heat to industry. If you will give us your specific requirements for a part or a product, we will develop the right processes, design, engineer and install the equipment and facilities to fulfill satisfactorily your quality and product standards.

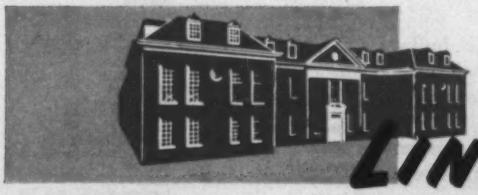
This service covers broad requirements—from plant layout and construction to automated production lines or just specially engineered industrial heating equipment efficiently integrated into your production processes.

For example, Lindberg Industrial Division has recently completed or is in the process of installing such varied projects as:

- Complete plant layout and equipment for brazing honeycomb
- Foundations, roof, lighting, furnace installations for heat treating raw aluminum products
- A fully automated production line for heat treating plow shares
- Installation of two large ceramic kilns embodying a new concept of making high-refractory bricks
- Complete plant and automated production line for preparing, enameling and drying household ranges.

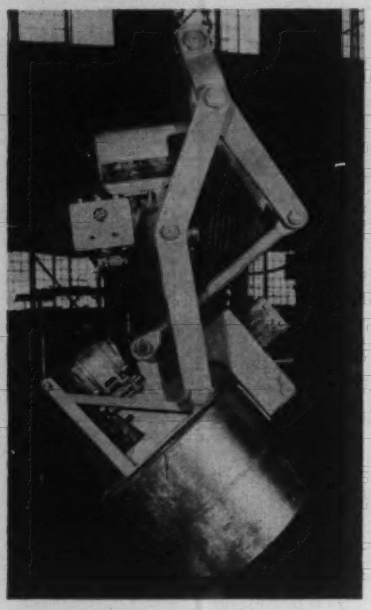
When you offer your industrial heating problems to Lindberg you get the combined skills of what we believe to be the country's finest group of engineers and technicians in the field, with many years experience in the solution of all types of "heat for industry" problems. Above all, since Lindberg provides a complete service, design, fabrication, installation, you depend on just one reliable source with the full responsibility for the satisfactory performance of your installation. So give your industrial heating problems to Lindberg. You'll be happy with the result.

Lindberg Field Engineers are available in 23 major industrial centers in the United States and Canada (see classified telephone directory) or write direct to:



Lindberg Industrial Division
LINDBERG ENGINEERING COMPANY
2321 West Hubbard Street, Chicago 12, Illinois
Los Angeles Plant: 11937 South Regentview Avenue, Downey, California
In Canada: Birlefco-Lindberg, Ltd., Toronto

LINDBERG heat for industry



screw jack, powered by an electric motor.

For further information, *write* American Forge & Mfg. Co., Nichol Street, McKees Rocks, Pa.

Metal Paints Protect Clean, Rusted Surfaces

FIVE PAINTS for metal finishing jobs have been developed by Du Pont. Three of the coatings are primers.

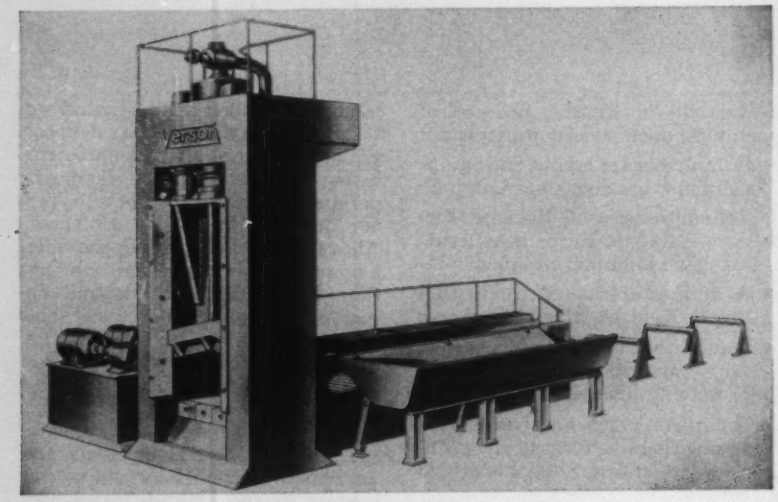
One is a special red lead version for iron, steel, or tin surfaces that can't be cleaned to bright metal. The coating is a special blend of resin and oils designed to penetrate rust and insure good adhesion to the metal.

A second primer is a zinc chromate type for aluminum, tin, iron, and steel (rustfree surfaces). It can be used for touchup and as an interior and exterior primer.

The third primer type can be used over new or nonrusted galvanized metal and copper. It can be water thinned and dries in 30 minutes.

The remaining two are wrought iron black and chrome finish aluminum. All of the primers can be topcoated with Duco enamel colors.

For further information, *write* Finishes Div., Fabrics & Finishes Dept., E. I. du Pont de Nemours & Co. Inc., Wilmington 98, Del.



Scrap Shear Has 1200 Ton Capacity

A CONVEYOR FEED, hydraulic scrap shear built by Verson Allsteel Press Co. (Chicago and Dallas), obtains extra large capacity from the open end charging box construction. The unit is rated at 1200 tons. Steel mill rejects or bulky railroad and heavy industrial scrap (any length) can be handled without torching.

The continuous conveyor system permits operation without interrup-

ASARCO

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Dixie Bronze Co., Inc.
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J. M. Tull Metal & Supply Co., Inc.
FAIRFAX 3-1612
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Little Rock
Arkansas Foundry Company
FRANKLIN 2-6261
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MARYLAND
Baltimore
Bronze Specialities, Inc.
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Bard Tool and Equipment Co.
FIRESIDE 3-2691
Lansing
Superior Brass & Aluminum Co.
IV 2-2754
Muskegon
Towne Hardware & Supply Co.
2-2651
MINNESOTA
Minneapolis
R. G. Eide, Inc.
FE 8-4846
MISSOURI
Kansas City
Associated Bearings Co.
VALENTINE 1-5393
Hubbell Metals, Inc.
BALTIMORE 1-7760
St. Louis
Hubbell Metals, Inc.
FRANKLIN 1-0212
NEBRASKA
Grand Island
The Island Supply Co.
DUPONT 2-8567
Omaha
T. S. McShane Co., Inc.
JACKSON 1273
NEW JERSEY
Carlstadt
E. A. Williams & Son
GENEVA 8-0800
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Federal Foundry Sales, Inc.
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Perth Amboy
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HILLCREST 2-2086
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STERLING 8-1144
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Kencroft Associates, Inc.
RIVERSIDE 1520
RIVERSIDE 2020
Rochester
Ontario Metal Supply, Inc.
HAMILTON 6-1630
Syracuse
Meloon Bronze Foundry, Inc.
GLENVIEW 4-3231
Troy
The Troy Belting & Supply Co., Inc.
AS 2-4920 (in Albany 3-6121)
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Akron Welding and Spring Co.
JEFFERSON 5-2187
Cleveland
Copper & Brass Sales, Inc.
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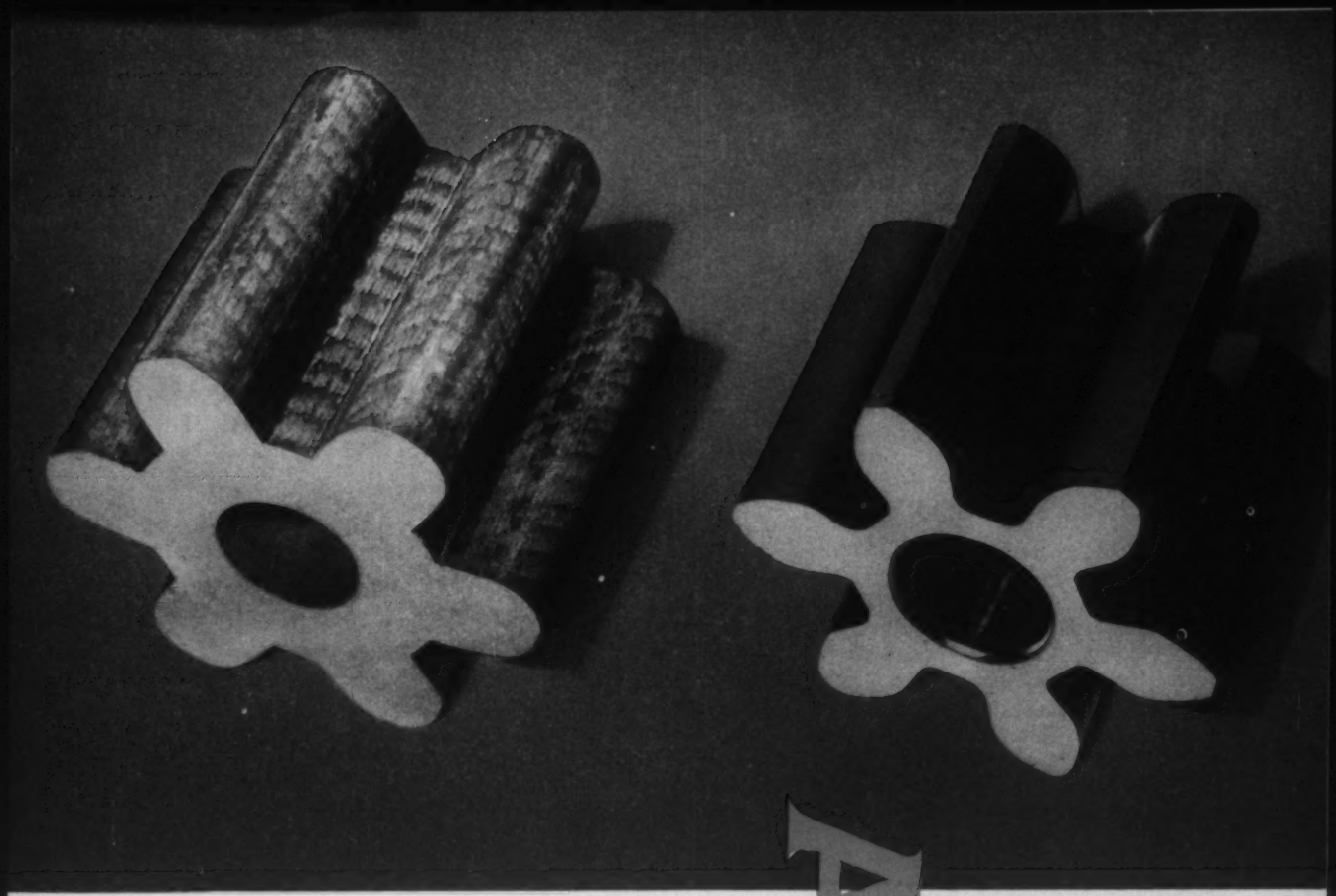


Note minimum clean-up necessary between casting of this 6-tooth pump impeller and finished part. (Illustrated parts are 4" in diameter.)

Custom shapes in continuous lengths:

ASARCON®

CONTINUOUS-CAST BRONZE CASTINGS

Before you design or produce a copper base alloy part, investigate the economy and efficiency of Asarco continuous casting. You can order the alloy and shape you need, in the exact lengths you need. Continuous Cast Asarcon Bronze alloys meet SAE, ASTM, and government specifications—but they are superior to the same alloys cast other ways, in hardness, yield, tensile and impact strength. In fact, you may be able to substitute an Asarcon Bronze for an aluminum or manganese bronze. Write for complete data to Continuous-Cast Department, American Smelting and Refining Company, Barber, N. J. or Whiting, Indiana.

Immediately available from stock: **ASARCON 773 BEARING BRONZE** (SAE 660)—260 sizes of rods and tubes. Complete range of sizes from ½" to 9" diameters. Immediately available from stock in 105" lengths. Special shapes produced to order.

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

CONTINUOUS CAST DEPARTMENT

West Coast Distributor: Kingwell Bros., Ltd., 457 Minna Street, San Francisco, Calif. In Canada. Federated Metals Canada, Ltd., Toronto and Montreal. Distributors in many principal cities.

tion. It cuts lengths in multiples of 6 in. to 5 ft or more.

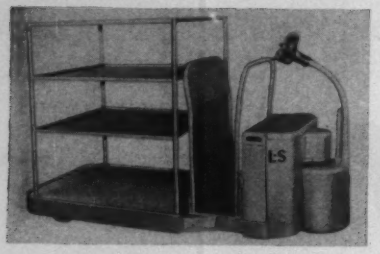
Another shear rated at about 400 tons is being designed.

For further information, *write* M. S. Kaplan Co., 231 S. LaSalle St., Chicago 4, Ill. (Exclusive distributors.)

All Purpose Truck Hauls Up to 10,000 lb

A CARRY-ALL truck, the Totemaster, can be equipped with a 12 or 24 volt electrical system. It's available in capacities from 2000 to 10,000 lb. An overdrive can be ordered for long, fast hauls.

Typical applications: Interplant delivery units or order selector trucks. Shelving is removable. Seats on the rear platform can be ordered. The unit is 97 in. long.

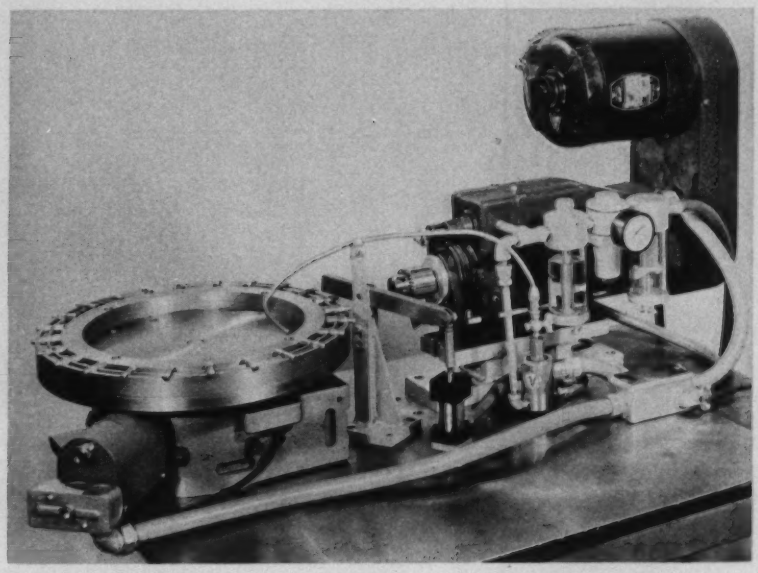


For further information, *write* Dept. R10-2, Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass.

Carbon Potential Liquid Cuts Decarburization

YOU CAN ward off decarburization and scale formation on carbon steels with a carbon potential liquid. It's designed for automatic injection under pressure during the high heat phase of luminous wall, gas fired furnaces.

The fluid supplies a supporting atmosphere which burns up excess oxygen and brings combustion products to a balanced state. Decarburization and scale are controlled and reduced to a minimum. The amount of liquid injected is governed by the size and Btu rating of the furnace.



POSITIONING WORK to perform numerous operations, such as assembly drilling, staking, and tapping, is the function of the Roto-Spacer rotary indexing table. It has automatic spacing to 0.001 in. of true position. The standard table has 24 stations. The work holding plates are 12, 15, and 20 in. in diameter. You can insert special screws in indexes that are not needed to adapt the unit to your job. For further information, **write** M & M Tool & Mfg. Co., 1124 E. Third St., Dayton 2, Ohio

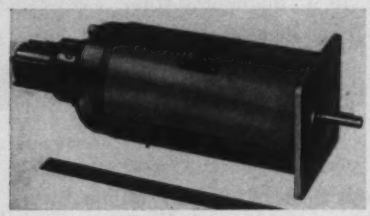
Several grades are available for processing steels with a carbon content from 0.20 to 1.00.

For further information, *write* A. F. Holden Co., 14341 Schaefer Highway-TR, Detroit 27, Mich.

High Response Motors Have Low Armature Inertia

A LINE of high response dc servo motors is designed for industrial applications requiring rapid starts, stops, and reversals. They're available in totally enclosed, nonventilated, cast iron frames in selected ratings in sizes from ¼ to 1 hp. Over-all frame length is 11 23/32 in.

When equipped with a typical control system, the 1 hp size can reverse from +3900 to −3900 rpm in 0.28 second. The motors have low armature inertia and high accelerating torque. The torque to inertia ratio is nine times that of a standard dc motor (equal horsepower). Skewed armatures and a special field pole design are used. Weight is 47 lb.

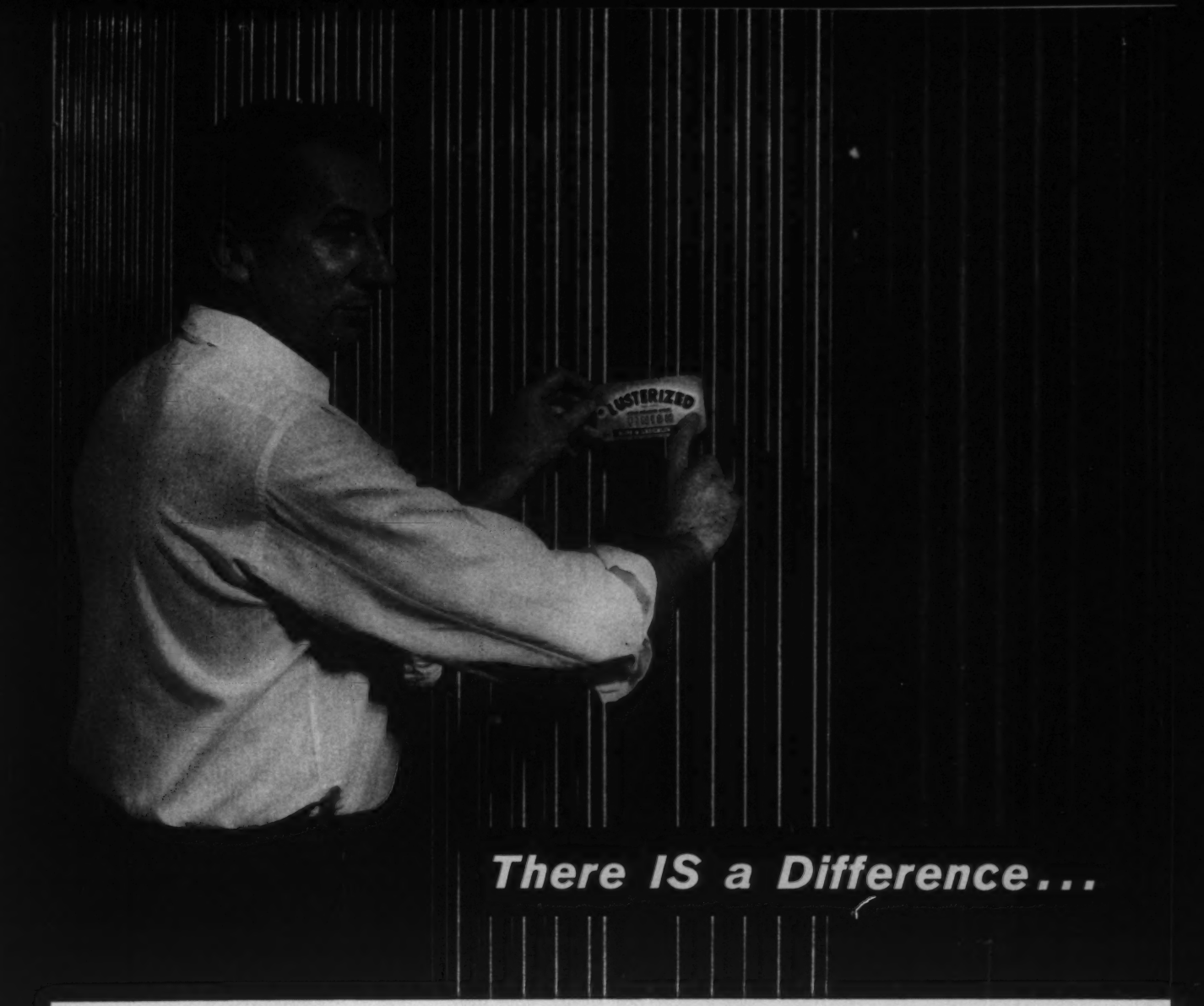


For further information, *write* Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Convection Ovens Use Stepless Control System

TWO TEMPERATURE ranges (350 and 650° F) are provided on the Power-O-Matic 60 mechanical convection ovens. The control system is completely stepless, switchless, and infinitely proportional. Temperature is constant, straight line, and repetitive throughout the entire oven range.

Line voltage variation has no effect on controlled temperature stability. Automatic ambient temperature compensation is part of the control assembly. The unit does not use contacts, auxiliary elements, am-



...a BIG DIFFERENCE in Cold Drawn Bars

Contrary to popular belief, all cold drawn bar steel is not alike. There is one big difference worthy of your specification—the Bliss & Laughlin difference.

Only B&L Lusterized® cold finished bars are different from all others. B&L bar steel is cleaner, brighter, easier to handle. The exclusive B&L cold finishing process (patent applied for) removes drawing oils, lime and processing grit, producing a smooth, gleaming bright surface without processing contaminants to slow your production. And B&L special protective oil keeps dirt, dust and other airborne contaminants from the Lusterized surface until you are ready to process the bars.

This big difference over other cold finished bar steel is another benefit developed from B&L research since 1891 to produce better cold finished bars.

You can see the difference. You can work the difference advantageously. Since you pay nothing extra for B&L Lusterized bars, it is always rewarding for you to specify "Bliss & Laughlin Lusterized."

Originators of LUSTERIZED® Finish—The BIG DIFFERENCE in Cold Drawn Bar Steel

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • PLANTS: Harvey, Detroit, Buffalo, Mansfield, Mass.

Specialists in Finish, Accuracy, Straightness, Strength and Machinability

plifiers, tubes, photocells, or timing devices.

Ovens are wired with a voltmeter and circuit breaker. Five standard models are available (from 1 to 24 cu ft).

For further information, *write* Blue M Electric Co., 138th & Chatham Street, Blue Island, Ill.

Induction Heating Unit Has Pushbutton Controls

INSTANTANEOUS, uniform, precise surface heating can be done with the Hayes induction heating unit. The compact console design has the heater stations and the power generator in a single unit.

Pushbutton controls permit nontechnical operators to obtain exact surface heating patterns without distortion, decarburization, or excess oxidation. The 30 kw unit is 6 ft 9 in. high, 5 ft wide, and 3 ft deep.

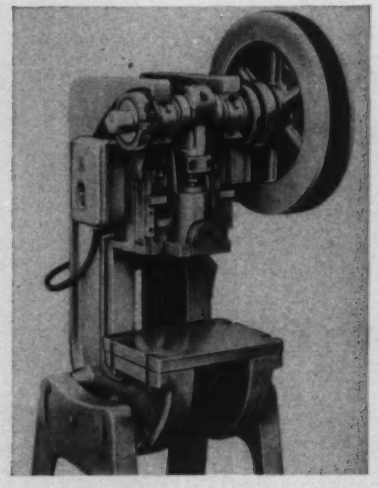
Controls and instruments are mounted at eye level.

You can order 5, 10, 20, 30, or 60 kw capacities. Accessories are available.

For further information, *write* C. I. Hayes Inc., Wellington Avenue., Cranston 10, R. I.

Series of 12 Ton Presses Has Shut Height Selection

A SERIES of 12 ton presses is available in standard OBI, deep throat, or slow speed models. A selection of shut heights is available. Overload detectors can be ordered for protecting dies. The presses are frequently used in multiple units interconnected by a common driveshaft.

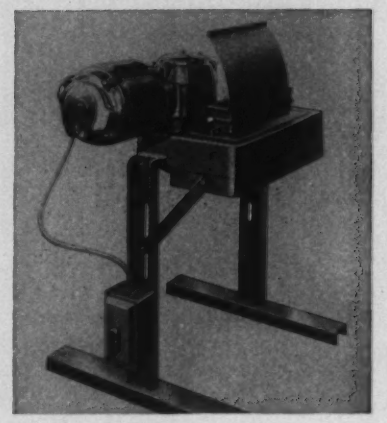


The one piece, slotless crankshafts are made of heat treated, alloy steel. Punch closure accuracy is maintained by extralong ram guides that control the ram during the working stroke. The drive mechanism is designed to carry several times the load required by rated tonnage.

For further information, *write* Kenco Mfg. Co., 5211 Telegraph Rd., Los Angeles 22, Calif.

Scrap Choppers Have Improved Cutting, Speeds

YOU CAN get more efficient scrap cutting at increased operating speeds with the self-contained Cooper Weymouth scrap choppers. As the skeleton scrap comes from the press, the units chop it into a size that's easily handled and stored.



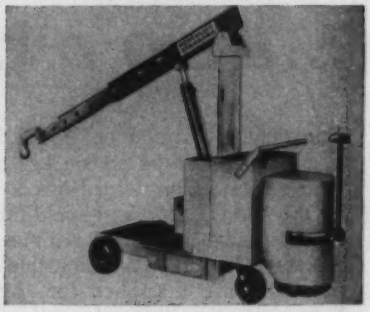
Design and structural improvements have made the cutting action more positive and have eliminated side motion of the cutting blades. The company says that even thin, hardened material may be chopped without blade spread.

Three sizes are available with capacities in mild steel from 6 x 0.062 in. to 12 x 0.093 in.

For further information, *write* Cooper Weymouth Inc., 600 Honeyspot Rd., Stratford, Conn.

Mobile Floor Crane Lifts, Positions 5000 lb Loads

THE Herculift, standard, mobile floor crane is designed for handling loads that are easier to transport with a hook. It's completely counterbalanced and is equipped with an adjustable boom and hook that reaches up to 6 ft beyond the front edge of the unit.

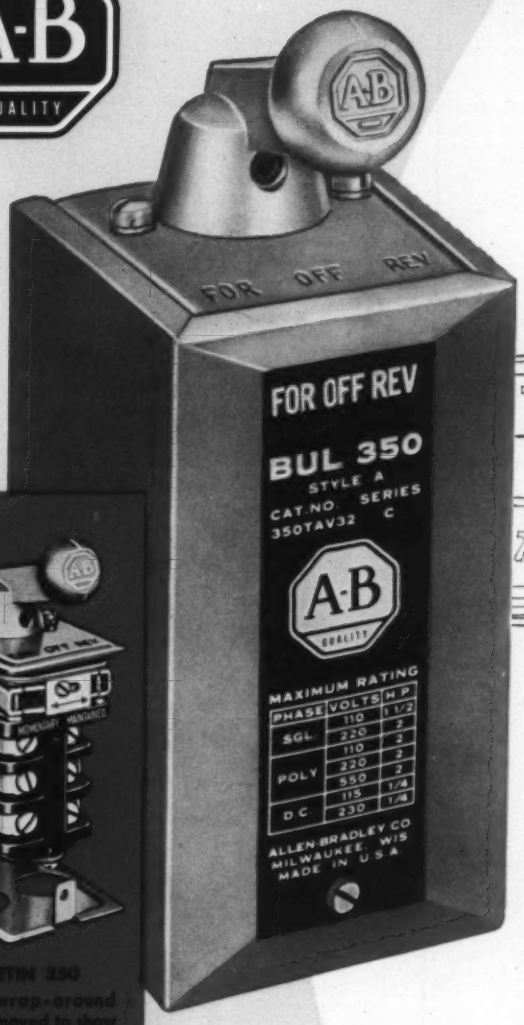


The crane can move in four directions and lift and position loads up to 5000 lb. The power boom lifting range can be varied from 1½ to 9 ft above floor level.

For further information, *write* Colson Corp., 7 S. Dearborn, Chicago, Ill.

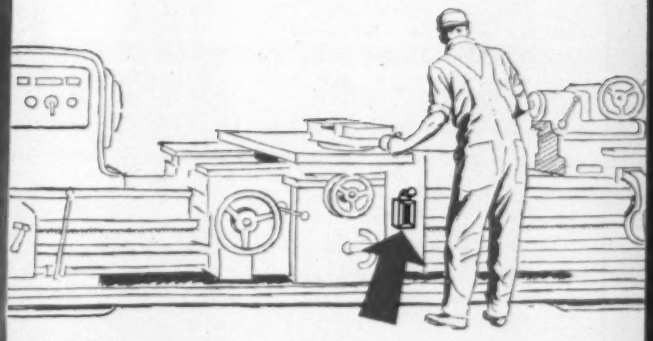
ALLEN-BRADLEY

REVERSING DRUM SWITCHES



BULLETIN 350

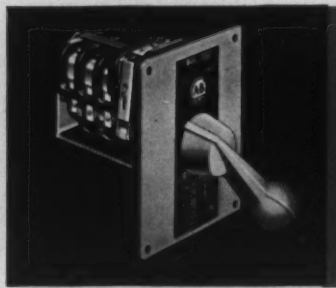
Style A wrap-around cover is removed to show the readily accessible front wiring terminals. Max rating: 2 hp.



...styled to match the most modern production machines!

Inside and out—this Allen-Bradley drum switch is *all* new. Its trim, modern lines and attractive die-cast aluminum handle will give your production machines "up-to-the-minute" styling.

But there is more than beauty to this new switch. The rugged switch mechanism is a self-contained unit—independent of the enclosure. Misalignment and binding *cannot* occur. The base mounts directly on machine surfaces—without using spacers. And with the wrap-around cover removed, terminal screws are exposed for fast wiring—from the front. Changeover from momentary to maintained contact operation can be made in seconds. Investigate this new "leader" in its field. Send for Publication 6091.



OILTIGHT CAVITY MOUNTING

A-B Style AF reversing switches can be furnished with sealed shaft and rubber-gasketed, oiltight cover for cavity mounting in a machine base.

PANEL MOUNTING

The new Style A switches can be furnished for mounting directly on panels. Nameplate which gives ratings is also included with each switch.

ALLEN-BRADLEY

Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

3-50-R

ALLEN-BRADLEY
Solenoid Starters give

MORE MILLIONS OF TROUBLE FREE OPERATIONS

. . . and for good reasons

• ONE MOVING PART

With this simple solenoid design, there's virtually nothing to go wrong—all trouble-causing bearings, pivots, and flexible jumpers have been eliminated.

• DOUBLE BREAK, SILVER ALLOY CONTACTS

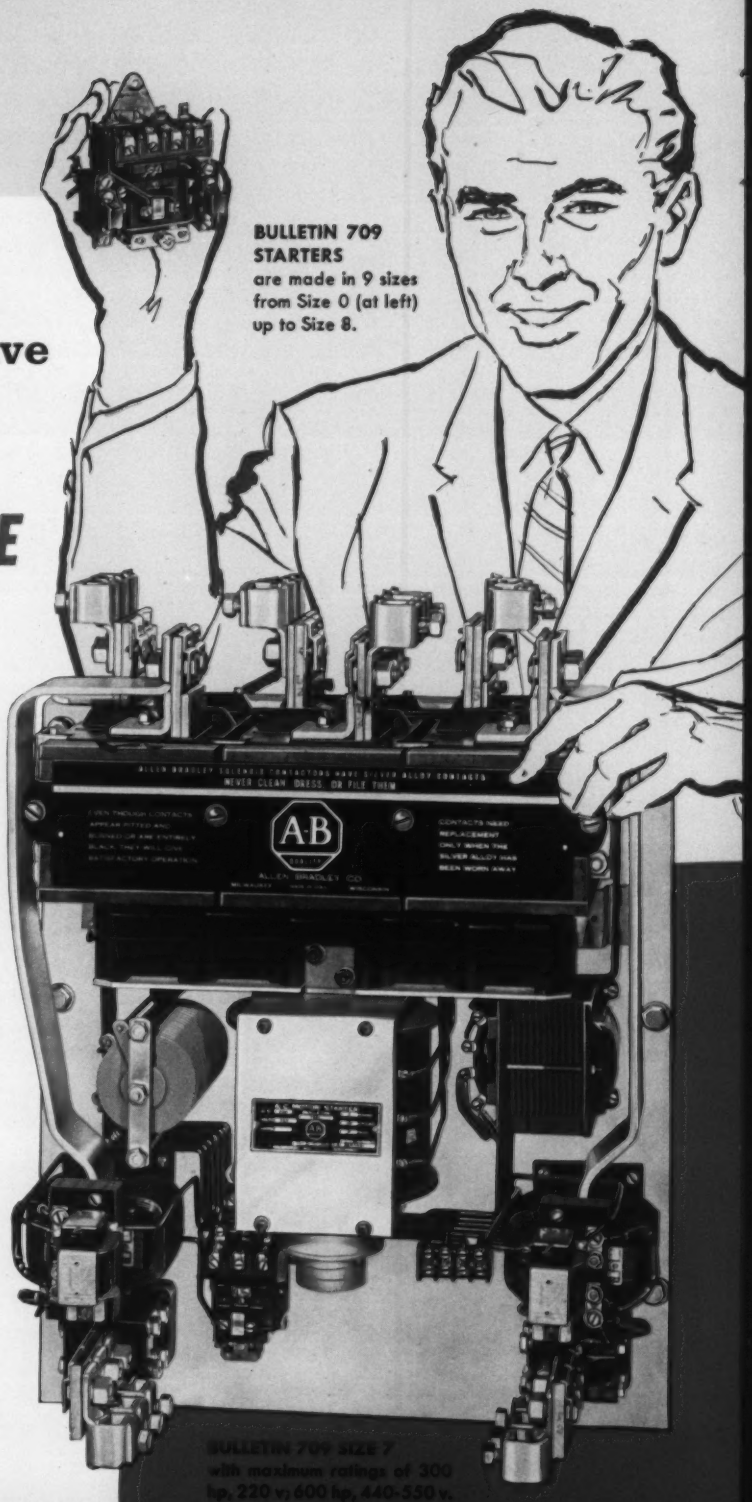
Allen-Bradley silver alloy contacts never require maintenance. They are always in perfect operating condition . . . and remain so until completely worn away.

• SIMPLE UP-AND-DOWN MOTION

The virtually frictionless, straight line vertical motion provides uniform contact pressure at all times—and assures consistent, rapid operation of the contactor.

• RELIABLE OVERLOAD PROTECTION

All A-B starters are equipped with two permanently accurate and reliable overload relays that protect motors against "burnouts." Three overload relays can be furnished.



BULLETIN 709 STARTERS are made in 9 sizes from Size 0 (at left) up to Size 8.

BULLETIN 709 SIZE 7 with maximum ratings of 300 hp, 220 v; 600 hp, 440-550 v.

ALLEN-BRADLEY
MEMBER OF NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL

NEW literature

Write directly to the company for a copy

Electric Furnace Brazing

Bulletin GEA-3193C, 50 pages, covers such subjects as the where and why of furnace brazing, how to remove copper from steel after brazing, application and selection of brazing metal, selection of flux, strength of furnace brazed parts, how to furnace braze cast iron, and remedies for furnace brazing elements. General Electric Co., Schenectady 5, N. Y.

Conversion Wall Chart

A wall chart of conversion factors includes common conversions such as inches to centimeters or watts to horsepower as well as many conversions that are difficult to locate in reference manuals. Precision Equipment Co., 4411E Ravenswood Ave., Chicago 40, Ill.

Diesel Engine Maintenance

"Ten Maintenance Steps" tells how to increase equipment availability, reduce operating costs, and obtain better engine performance. Sales Service Dept., Cummins Engine Co. Inc., Columbus, Ind.

Corrosion Resistance Chart

A 4 page chart, J-CRC, lists over 150 different chemicals and their recommended usage with Ductile iron, iron, steel, Type 316 and 304 stainless steels, Monel, brass, bronze, copper, aluminum, and plastisol plastic. OPW-Jordan, 6013 Wiehe Rd., Cincinnati 13, Ohio.

Fasteners

A 24 page fastener catalog discusses driving cycles, strength data, typical applications, grip ranges, and dimensional data. It also carries hole size recommendations and installation notes on a line of fasteners. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

Glass Maintenance

Installation, operation, and maintenance procedures for glassed-steel reactors are detailed in Manual 983, 12 pages. Pfaudler Co., 1110 West Ave., Rochester, N. Y.

Fluoroscopic Inspection Data

A 12 page booklet discusses limitations and advantages of conventional fluoroscopy, basic principles, preliminary investigations, pilot installation, production unit, and fluoroscopic standards for mill control of weld quality. Philips Electronic Instruments, 750 S. Fulton Ave., Mt. Vernon, N. Y.

Investment Casting

A 20 page brochure shows some of the possibilities now available in ceramic shell investment casting. Hitchiner Mfg. Co. Inc., Milford 30, N. H.

it's Jewel Bright

takes tough twists without

FLAKING, POWDERING, or PEELING

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Brytite®

A PATENTED GALVANIZING PROCESS

CHAIN QUALITY WIRE

The Zinc Coated Wire with the Plated Look

Brytite Wire is so shiny bright and satin smooth that electroplating and special finishing operations are not needed —a valuable saving in labor and materials! The coating is so tight that it withstands severe deformation of the base metal—takes hard turns and twists without flaking, powdering, or peeling.

In Many Sizes, Finishes, Tempers and Analyses

Specify BRYTITE in Satin Finish, Unwiped, or redrawn (in certain sizes)... in various tempers and analyses in low carbon and medium low carbon steels... for quality weldless or twisted wire chain, or wherever long-lasting brightness is desired. Special shapes, too.

Free Manual of Continental Manufacturers' Wire. Contains details of BRYTITE and other types of Continental Wire. Write for copy.

Fine Finishes in Manufacturers' Wire

CONTINENTAL STEEL

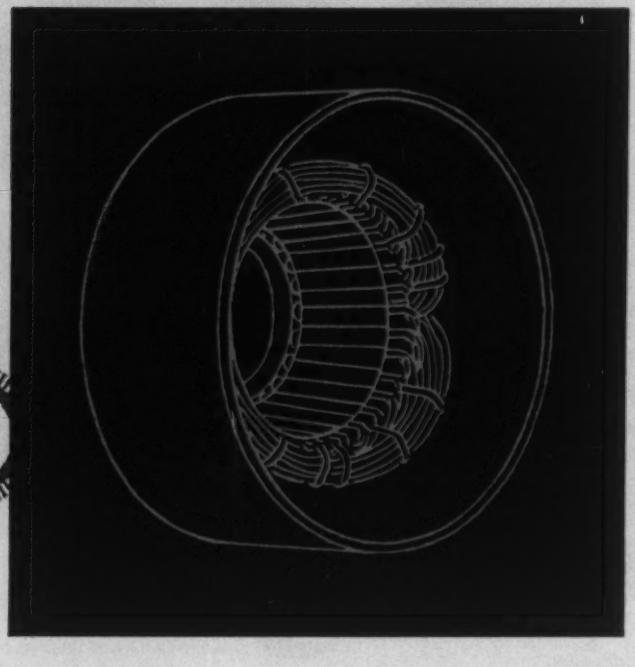
CORPORATION—KOKOMO, INDIANA

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame Sealed, Coppered, Tinned, BRYTITE, Annealed, Liquor-Finished, Bright, and Special Shaped Wire. Also Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.

Acme-Newport Steel

UNIFORMITY

IN ELECTRICAL SHEETS PROVIDES PERFECT MOTOR PERFORMANCE



FINE ELECTRICAL EQUIPMENT has its beginning in the electric furnaces of this basic steel producer. A mill recognized for over forty years for its absolute adherence to every specification for high-quality electrical grades.

Complete controi through successive steelmaking processes ensures uniformity in physical characteristics and electrical and magnetic properties. Exceptionally true to gage, free from burrs and breaks in punching, easy and economical to assemble, Acme-Newport electrical sheets prove as satisfactory to manufacturers of rotating equipment as to ultimate users. Let our metallurgists give you details.

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

Auto Cutbacks Ease Cold Rolled Market

WITH MORE THAN 900,000 cars jamming distribution channels, automakers have decided that they'll have to trim production schedules and reduce their steel purchases. But, generally, steel producers will have little difficulty selling the cold rolled sheets that have been set back.

Latest reports from dealers show that sales are trending upward, but the movement isn't strong enough to warrant continued production at the February pace. Instead of turning out a record 2.25 million cars in the first quarter, automakers will produce about 1.9 million. In the second quarter, they're expected to build about 1.6 million.

Although industry leaders haven't recanted their prediction that U. S. assemblies will reach 6.5 million this year, the talk in Detroit is that 6.2 million would be a better guess.

LESS BUYING FOR APRIL—By one estimate, the automakers are ordering about 15 per cent less tonnage for second quarter delivery than they bought for the first quarter. They're canceling some orders that were previously booked and deferring delivery of others. One reason for the cancellations: In December, when it appeared that the steelworkers would resume their strike, carbuilders tried to protect themselves by placing duplicate orders with mills that would not be closed. In addition, they lined up conversion deals and placed big orders with foreign producers at premium prices. Now they're getting shipments from all directions. Much of the material is below standard quality or above the market price.

One automaker has reportedly been trying to buy its way out of a commitment to take a large shipment of Italian steel at a $1 million premium. Another would like to dump a considerable tonnage of foreign steel that has been delivered.

THE BEAUTY OF OVERBOOKING—For the most part, steel producers can find other markets for the cold rolled sheets that automakers set back. In other products, such as carbon and alloy bars, wire, and stainless, the dislocations are more serious. Mills that put no limits on the tonnage they would accept for first half delivery are sitting pretty. They might have been accused of overbooking, but they realized that peak demand couldn't last forever. When the turnabout came, they figured that they would at least have a chance of holding an order that was on their books. There would be little opportunity of drumming up new business when the scramble for orders to replace canceled tonnage began.

DISTRIBUTORS WELL STOCKED—Since the first of the year, steel service centers have boosted their inventories of industrial products (plates, shapes, bars, sheets, and tubing) from 950,000 tons to 1,750,000. "The rebuilding job is about 30 days ahead of schedule," says Robert G. Welch, executive vice president, Steel Service Center Institute. "Stocks will be up to normal, about 3.5 million tons, by midyear," he adds. Since warehousers got 15 to 20 per cent more steel than they expected in January and February, many dropped out of mill schedules for March or cut back their orders.

RECORD OUTPUT FOR MONTH—Last week, steelmakers operated their furnaces at 94 per cent of capacity, up 0.2 point from the previous week's revised rate. Production was about 2,678,000 ingot tons. February's output, close to 11 million ingot tons, set a record for the month—far surpassing the 10,118,995 tons poured in February, 1956.

WHERE TO FIND MARKETS & PRICES

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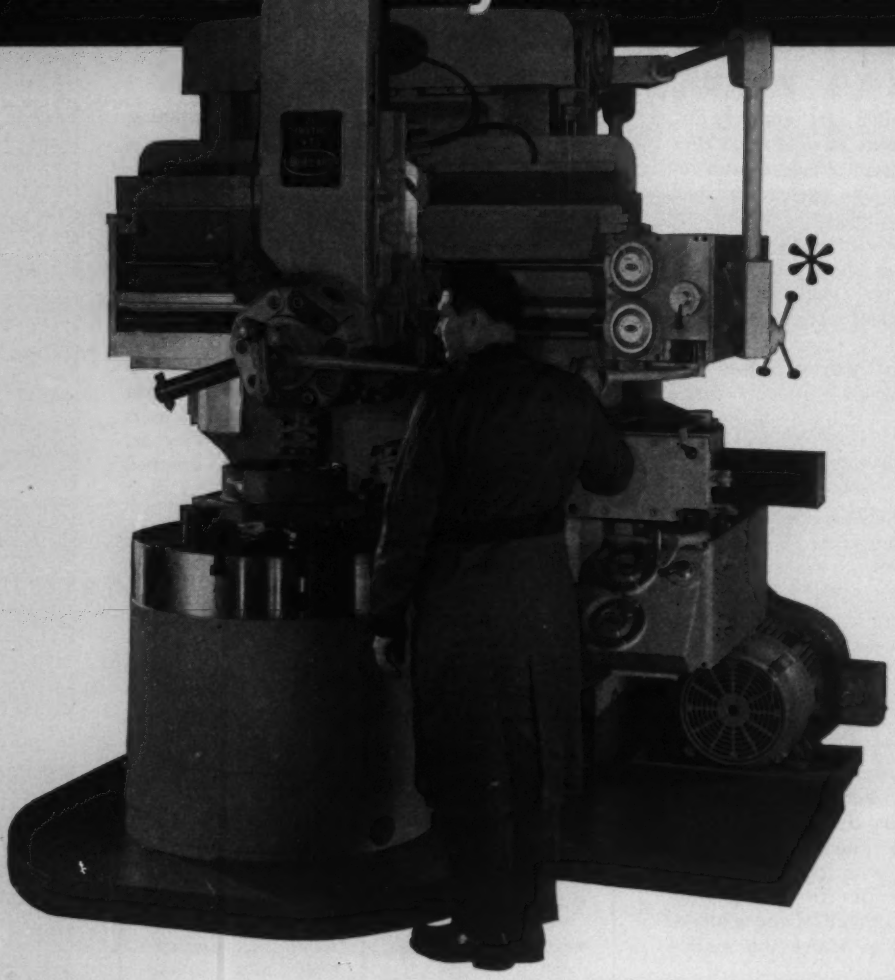
*Current prices were published in the Feb. 22 issue and will appear in subsequent issues.

NOW Bullard DYNATROL*
FIRST fully Power-Controlled V.T.L.



Dynatrol* V.T.L. has Bullard's new Dynamic Precision Control . . . a fully powered machine tool control system which pays off in greater production.

Dynamic Precision Control keeps the tool in the cut more of the time . . . cuts time between cuts . . . increases the operating speed and output of the machine.

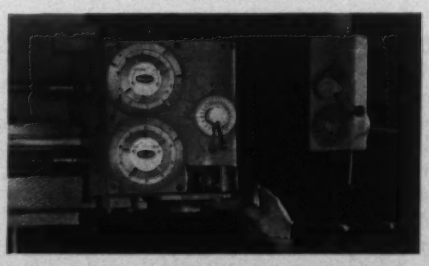
Dynatrol provides **infinitely variable feed rates** throughout the full range and **variable traverse rates** from zero to nine feet per minute. Feed rates may be advanced or retarded while the machine is cutting to obtain maximum tool performance and productivity.

Nine sizes from 26" to 124" table diameter.

Send to The Bullard Company, Bridgeport 9, Connecticut, for detailed catalog. Telephone EDison 6-2511.

*Trademark

The control center of the New Bullard Dynatrol V.T.L. provides single lever control for all motions of each head. Feed rates — infinitely variable from zero to maximum — are directly geared to table rpm. A simple pendant controls start, stop and speed of table. Equally simple remote controls are available for machines of all sizes.



High-Spot Features of the DYNATROL® V.T.L.

Dynatrol V.T.L. is POWER CONTROLLED

By lever or pendant — it's your choice — head traverse rates can be varied from zero to nine feet per minute. Easy-to-read dials show exact position.

Feed selector gives infinitely variable feed rate without interrupting the cut.

Dynatrol V.T.L. is VERSATILE

Available equipment includes:

Bullard variable speed drive for infinitely variable table speeds throughout the full range with no loss of usable horsepower.

Fully automatic operation by Bullard Man-Au-Trol or point-to-point or continuous path numerical control systems.

Unique Size-Au-Trol® for accurate positioning of all heads. Contouring attachments: Hydraulic, electronic or electro-hydraulic. Four- or five-sided power-indexing turret heads. Thread cutting, drum scoring and angle turning attachment. Power-operated chucks.

Dynatrol V.T.L. is COMPACT

The new Bullard Dynatrol V.T.L. is compact in design, rigid in construction, lower in height, reduced in floor area.

Dynatrol V.T.L. is EASY TO MAINTAIN

Automatic lubrication throughout... fewer parts... fewer adjustments... easily accessible.

BULLARD "YOU CAN'T BEAT A BULLARD"

Galvanizers Expand to Meet Demand

Continuous coating lines in operation, under construction, and contemplated in the U. S. and Canada

Company & Location	Number	Startup Date	Galvanizing and/or Aluminizing
Armco Steel Corp.			
Ashland, Ky.	1	July, 1954	Galvanizing
	1	Nov., 1954	Galvanizing
Butler, Pa.	1	June, 1938	Either
	1	April, 1940	Either
Middletown, Ohio	1	April, 1946	Galvanizing
	1	April, 1949	Galvanizing
	1	Under construction—due in late 1960	Either
Bethlehem Steel Co.			
Sparrows Point, Md.	1	March, 1952	Galvanizing
	1	July, 1955	Galvanizing
	1	Jan., 1956	Galvanizing
Columbia-Geneva Steel Div., U. S. Steel Corp.			
San Francisco	1	March, 1953	Galvanizing
Dominion Foundries & Steel Ltd.			
Hamilton, Ont.	1	June, 1955	Galvanizing
	1	Under construction—due in April, 1960	Either
Granite City Steel Co.			
Granite City, Ill.	1	Dec., 1956	Galvanizing
	1	Under construction—due in 1960 or 1961	Galvanizing
Inland Steel Co.			
Indiana Harbor, Ind.	1	May, 1951	Galvanizing
	1	May, 1953	Galvanizing
	1	Nov., 1955	Galvanizing
	1	Contemplated for 1961	Either
Jones & Laughlin Steel Corp.			
Pittsburgh	1	Jan., 1956	Galvanizing
Midwest Steel Corp., Div. of National Steel Corp.			
Portage, Ind.	2	Under construction—due after July, 1960	Galvanizing
Reeves Steel & Mfg. Co., Div. of Empire-Reeves Steel Corp.			
Dover, Ohio	1	Nov., 1955	Galvanizing
Republic Steel Corp.			
Warren, Ohio	1	Aug., 1955	Galvanizing
Gadsden, Ala.	1	June, 1957	Galvanizing
H. H. Robertson Co.			
Ambridge, Pa.	1	March, 1957	Galvanizing
Sharon Steel Corp.			
Farrell, Pa.	1	Feb., 1952	Either
Steel Co. of Canada Ltd.			
Hamilton, Ont.	1	June, 1955	Galvanizing
	1	Under construction—due in June, 1960	Galvanizing
Tennessee Coal & Iron Div., U. S. Steel Corp.			
Fairfield, Ala.	1	March, 1949	Galvanizing
	1	April, 1949	Galvanizing
	1	Aug., 1953	Galvanizing
U. S. Steel Corp.			
Dravosburg, Pa.	1	Jan., 1948	Galvanizing
	1	April, 1949	Either
Gary, Ind.	1	March, 1950	Galvanizing
	1	Nov., 1954	Galvanizing
Weirton Steel Co., Div. of National Steel Corp.			
Weirton, W. Va.	1	Jan., 1954	Galvanizing
	1	Nov., 1954	Galvanizing
	1	Sept., 1957	Galvanizing
	1	May, 1958	Galvanizing
Wheeling Steel Corp.			
Martins Ferry, Ohio	1	Nov., 1953	Galvanizing
	1	Aug., 1955	Galvanizing
Youngstown Sheet & Tube Co.			
Indiana Harbor, Ind.	1	Under construction due in mid-1961	Galvanizing
TOTALS	43		36 Galvanizing 7 Either

Source: American Zinc Institute Inc.

PRODUCERS of galvanized and aluminized sheets are in the best position ever to meet the surging demand for their products. Expansion plans indicate they intend to keep ahead of the market.

As the table above shows, there are 35 continuous coating lines operating in the U. S. and Canada, with six more scheduled to start rolling this year. In addition, two more will be completed in 1961. STEEL's sources say several are in the "talking" stage, but they are several years away from production.

Demand outside of North America also is brisk. There are 18 continuous lines in operation in nine Free World countries, with four more coming in during 1960. Japan has the most lines (seven).

TAKE . . . 5

And add our name to your list of supplies for heavy iron or steel castings.

Write for bulletins and complete details on how we may be of service.

HEAVY CASTINGS

LARGE MACHINE WORK

CUSTOM PLATE FABRICATION

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MANUFACTURING CO., INC.
P. O. BOX 631 • BIRMINGHAM, ALABAMA
Filters / Evaporators / Process Equipment / Contract Manufacturing including Heavy Castings

Steel Bars . . .

Bar Prices, Page 120

Further cutbacks and cancellations are reported in the steel bar market. Most producers of hot bars are no longer working on a strict allocation basis. Cold finished bars are also in easier supply; so are alloys.

A forging bar producer last week said: "We're running at capacity and are sold out through March." However, while order books of most makers are relatively firm, there is a notable absence of urgency about shipping dates.

The auto builders are not quibbling over shipments, apparently not yet having made up their minds on second quarter needs. They bought as much metal for April as they did for March. But bar mills expect a downward adjustment in auto buying within the next 30 days.

Some auto builders are burdened with huge tonnages of foreign steel ordered before the recent labor agreement. One firm is trying to buy its way out of a commitment to take a large shipment of Italian steel that was bought at a $1 million premium. Still another company would like to unload a large foreign tonnage, and the potential repercussions on the market are highly disturbing to American steelmakers.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 121

Order backlogs of concrete reinforcing bars are relatively heavy, but they are unevenly distributed. A seasonal surge in ordering is expected to swell order books sharply over the next couple of months.

Some fabricators are depending on imported bars to meet their requirements. The bulk of the tonnage was booked at highly favorable prices. Frequently, distributors of domestic bars drop out of contention for business when bids go too low.

• If you're a follow-through type, read the Servicenter for a way to win $1000.

Steel Importers Offering Cut Rate Prices in Texas

Stockpiled foreign steel is moving at cut-rate prices in the Southwest as brokers seek to liquidate their holdings. Incoming shipments can be bought at less than the price of futures. Texas traders are certain foreign mill prices will be reduced sharply before midyear.

The price weakness on imported steel is tending to slow down orders on the local mills. Consumer inventories are increasing ahead of schedule. One district mill started shipping March delivery tonnage this month.

Tubular Goods . . .

Tubular Goods Prices, Page 126

Demand for oil country goods is lifeless. Shipments are exceeding incoming orders. Demand for carbon casing and tubing is weak. The only products that remain in tight supply are alloy tubing and special joints.

Inventories depleted during the strike are rapidly being rebuilt, and it's apparent that consumers aren't going to stock as much tonnage as they have in the past. Since money is tight and the mills can give prompt deliveries, buyers are shifting the warehousing function to producers, relying on downriver terminals for tonnage as needed.

Oil well drilling is down to almost the lowest point in more than a decade. Hughes Tool Co. reports that in the week ended Feb. 15 rotary rigs operating totaled 1618, just one more than the lowest point since April, 1957. The total was 60 fewer than in the preceding week, and 243 smaller than in the comparable 1958 week.

Demand for cast iron pipe is picking up seasonally. Bids are pending for 638 tons at Anchorage, Alaska, and 392 tons at Tacoma, Wash. Enumclaw, Wash., which recently took bids on 113 tons of pipe, bought steel pipe. Port Angeles, Wash., divided a 171 ton order among various types of pipe. South Bend, Wash., purchased a small lot of 12 in. cast pipe for a river crossing, and bids have been asked Mar. 1 by Pullman, Wash., on an unstated amount.

El Paso Natural Gas Co. has been authorized by the Federal

Send *Today* for this New Data on *Upward-Acting* Doors for Every Need

Kinnear originated the interlocking slat door

Get full details on this complete line of time-saving, cost-slashing doors. They add highest efficiency to space-saving, coiling upward action. Kinnear offers a wide choice of flat and curved slats—fabricated of aluminum, zinc-coated steel, or other metals. They fit every need, from small counter openings to largest doorways. Slat sizes range up to the seven-inch "Goliath" slat at the extreme left, above — maximum protection against wind, weather, intrusion or vandalism!

Zinc-Coated *Dual* Protection

Kinnear Steel Rolling Doors feature extra-heavy hot dip galvanizing! 1¼-ounces of pure zinc per square foot of metal (in accordance with ASTM standards). And Kinnear's special phosphate treatment makes this zinc surface ready *immediately* for thorough paint grip.

Make sure you get this complete door guide — check it *now!*

KINNEAR ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
FACTORIES:
1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

Power Commission to build a 121 mile pipeline to carry natural gas to customers in Washington and Oregon.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 121 & 122

Sheet and strip producers expect to operate near capacity through June. They are under less pressure, however, and are aggressively seeking new business, with orders running about 15 per cent under those a month ago.

Galvanized sheets remain in tightest supply, but hot and cold rolled sheets and strip are noticeably easier than they were. Some customers are requesting that March deliveries be pushed into April, and April shipments be deferred to May.

While some mills continue to set quotas for the second quarter, consumers haven't accepted their allocations as quickly as they had been expected to. Leadtime for April rollings was Feb. 15, but the mills found many customers did not fully specify or accept their full quotas. One Midwest mill offered its regular customers above quota tonnage, but the response of buyers fell considerably short of filling April order books.

Some mills have relatively little hot and cold rolled tonnage open for delivery before June, and they have none at all in galvanized before July. Sheet specialties can be had for late April shipment. Demand for electrical steels used in large motors and stators is noticeably off.

Plates . . .

Plate Prices, Page 120

Plate consumers are not rushing to place new business on mill books. Demand, if anything, is easier than it was a week ago. Sheared plates are available in five to seven weeks, and alloy plates and specialties can be had for delivery in six to eight weeks.

Lack of shipwork and fabricated pipe is chiefly responsible for the sluggishness, but boiler work is slow, and railroad demand is spotty.

Bids are in to Washington State for a water tank at Medical Lake Hospital involving more than 100 tons of plates. Montlake Terrace, Wash., will take bids Mar. 7 for a 1.8 million gallon steel water tank.

Wire . . .

Wire Prices, Pages 122 & 125

Most grades of merchant wire can be had for delivery within two to three weeks. Manufacturers' wire and wire rods are available in early April. Demand continues to be disappointing.

U. S. Steel Corp. is low bidder on the cables and suspenders for the Narrows Bridge, Brooklyn-Staten Island, N. Y. About 41,000 tons are involved. John A. Roebling's Sons Div., Colorado Fuel & Iron Corp., was second low, and Bethlehem Steel Co. third.

The wire probably will be drawn at Trenton, N. J., and the raw steel poured at the Fairless Works.

Distributors . . .

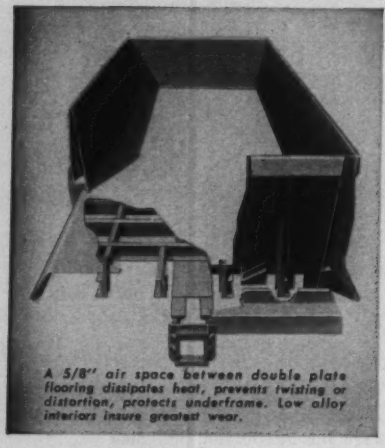
Prices, Page 127

Steel service centers are encountering stiff competition. Demand for most products is only fair. Exceptions are galvanized and cold rolled sheets.

Bookings were 25 to 30 per cent

MAGOR AIR DUMP CARS

FOR STEEL PLANT SERVICE



A 5/8" air space between double plate flooring dissipates heat, prevents twisting or distortion, protects underframe. Low alloy interiors insure greatest wear.

The new Magor Air Dump Car for steel plant service can cut your refuse disposal costs as much as 40%! Safe, swift, automatic dumping eliminates expensive labor and crane equipment. Low height and open type body means faster loading. Saves time, labor and haulage costs! Smooth interiors eliminate "dead load" returns!

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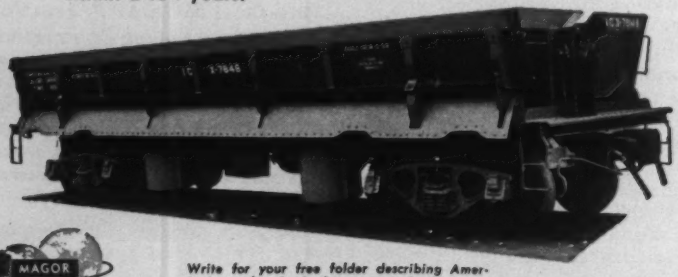

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heavier in January than in the like 1958 month. The comparison has not been as favorable in recent weeks, indicating that the total for the first quarter will show little change from that of a year ago.

The revision in prices on hot rolled carbon steel products, involving decreases and increases, is spreading to additional areas. Philadelphia district sellers have the matter under study and are expected to take action soon.

Blast Furnace Output in January Breaks Record

Blast furnaces in the U. S. produced a record 7,830,097 net tons of pig iron and ferroalloys during January, reports the American Iron & Steel Institute. The previous high for any month, 7,747,996 tons, was set in May, 1959.

Of the total production during the month, 76,344 tons were ferromanganese and spiegeleisen. Blast furnace operations averaged 95.5 per cent of capacity during the period. Production by states follows:

Blast Furnace Production—January, 1960
(Net tons)

States:	Net Tons	% of Capacity
Massachusetts and New York	498,085	95.5
Pennsylvania	2,186,470	97.6
Maryland, Virginia, West Virginia	656,203	93.6
Kentucky, Tennessee, Texas	167,321	89.5
Alabama	417,440	84.5
Ohio	1,509,069	94.8
Indiana	848,773	96.8
Illinois	695,827	103.0
Michigan, Minnesota	473,482	93.1
Colorado, Utah, California	377,427	94.1
Total	*7,830,097	95.5

*Includes 76,344 tons of ferromanganese and spiegeleisen.
Data from American Iron & Steel Institute.

Pig Iron . . .

Pig Iron Prices, Page 127

Foundries are placing pig iron orders conservatively, covering only immediate needs. Producers in the Buffalo district are stockpiling iron, preparing for the opening of the Great Lakes navigation season.

Blast furnace operations averaged 95.5 per cent of capacity in January. Production totaled 7,830,097 net tons, of which 76,344 tons were ferroalloys.

Debevoise-Anderson Inc., Philadelphia, has been appointed agent for Colorado Fuel & Iron Corp. for the sale of iron in Virginia, Maryland, Delaware, Pennsylvania, New

sprays or flows the new
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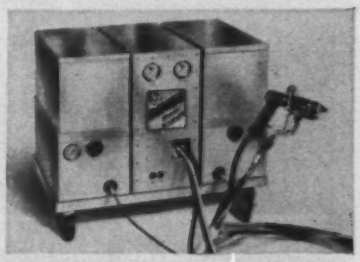

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York, and New England. CF&I's furnace at Birdsboro, Pa., resumed operation early in February after being closed down since start of the strike in mid-July last year.

Iron Ore . . .

Iron Ore Prices, Page 128

Steep Rock Iron Mines Ltd. shipped 2,747,357 tons of iron ore during the 1959 lake navigation season. That was more than double the 1,156,358 tons shipped in the 1958 navigation season. Shipments last year were the second highest on record for the company. The peak: In 1956, 3,317,073 tons were moved.

Iron Ore Imports Heavier In First 11 Months, 1959

Imports of iron ore from ten countries in November, 1959, totaled 3,811,000 gross tons, reports the U. S. Bureau of Mines. The total for the first 11 months of the year was 32,611,453 gross tons, valued at $285,392,422. In the first 11 months of 1958, the total was 25,822,073 gross tons, valued at $218,391,683.

Canada supplied 40 per cent of total imports in November, Venezuela 37 per cent, Peru 9, and Chile, Brazil, Liberia, British West Africa, Mexico, Sweden, and the Philippines the remaining 14 per cent. The breakdown of imports for November and the first 11 months of 1959, by countries of origin, follows:

Iron Ore Imports, November, 1959

(Gross tons)

Countries of Origin	November	First 11 Months
Angola	.....	16,500
Brazil	138,273	1,134,669
British W. Africa	23,970	62,071
Canada	1,541,454	13,041,133
Chile	322,356	3,300,263
Cuba	.....	1,600
Denmark	.....	554
Dominican Republic	.....	50,370
Iran	.....	2,756
Liberia	30,650	923,596
Mexico	6,983	84,861
Norway	.....	14,690
Peru	322,350	1,880,714
Philippines	5,000	70,998
Spain	.....	209
Surinam	.....	2,320
Sweden	18,010	66,045
United Kingdom	.....	18,954
Venezuela	1,391,853	11,939,210

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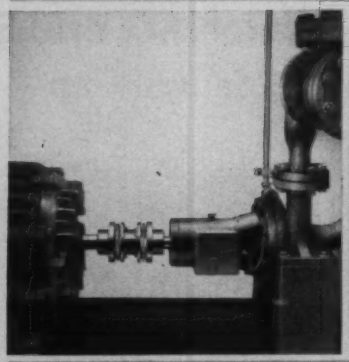

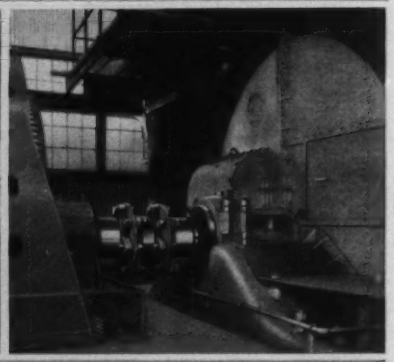

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THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

Canadian Steel Output Maintains Record Pace

Canadian steel mills are maintaining production at a record level. January output of ingots was 563,183 tons, a new monthly peak. It compared with 540,748 tons in December, 1959.

In the week ended Feb. 6, steel ingot production amounted to 124,581 tons vs. 127,205 in the week immediately preceding.

Pig iron output in January was 374,649 tons, a monthly record. Comparison: 371,053 tons in December, 1959.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 128

Production of coke in the U. S. in December totaled 6,140,560 net tons (6,051,720 oven, 88,840 beehive), reports the Bureau of Mines. In November, output was 4,334,813 tons (4,269,695 oven, 65,118 beehive), and in December, 1958, it was 5,521,200 tons (5,437,100 oven, 84,100 beehive).

December production was the largest for any month since May, 1959. Furnace operating rates, both

merchant and furnace plants, increased sharply in the month, averaging 72.7 per cent for merchant, and 88.8 per cent for furnace plants.

Stocks of oven coke at producers' plants decreased nearly 500,000 tons during December, totaling 4,505,053 tons at the end of the month, equal to 23.1 days' production. That compares with 3,812,516 tons (21.7 days) at the end of December, 1958.

Production of oven coke during 1959 amounted to 54,612,986 tons. Beehive output totaled 1,093,955 tons.

Oven Coke Production—1959

(Net tons)

Districts	Totals
Eastern	11,071,861
Pittsburgh-Youngstown	18,150,315
Cleveland-Detroit	7,248,934
Chicago	10,125,992
Southern	5,701,430
Western	2,314,454
Total	54,612,986

Beehive Coke Production—1959

(Net tons)

States	Totals
Pennsylvania	755,128
Virginia	239,450
Kentucky & W. Va.	99,377
Total	1,093,955

Structural Shapes . . .

Structural Shape Prices, Page 120

Inquiries for structural shapes are increasing, but awards are still coming through slowly. Most fabricators are fairly comfortably booked for the next two to four months.

Plain material supply is easy, with standard shapes available for March delivery and wide flange tonnage in early April. Carbon plates can be had for delivery in five to seven weeks.

Fabricators in New England will have balanced inventories by the end of March. Some are now easing up on mill orders, and will hold down procurement in the second quarter to fill-in tonnage. Bridge estimates are increasing, and demand for light structurals for schools, shopping centers, and the like is mounting.

Competition is keen among fabricators for new work. This will ease off as the building season opens up.

With a low bid of $56,896,390, U. S. Steel Corp. is expected to be awarded the contract for 41,000 tons of cables and suspender rope for the Narrows Bridge, Triborough Bridge & Tunnel Authority, New York. John A. Roebling's Sons Div., Colorado Fuel & Iron Corp., was second low at $59,656,572, and Bethlehem Steel Co. was third low at $61,712,594.

Bids went in Feb. 24 on 53,000 tons of steel for the bridge towers. Bids on 66,000 tons for the suspended structure will not come out for figures for some time. Tower foundations, on which J. Rich Steers Inc. and Frederick Snare Corp. are joint contractors, will require an additional 13,000 tons, mostly reinforcing steel.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

316 tons, Washington State, Cowlitz River bridge, to Poole, McGonigle & Dick, Portland, Oreg.; Anderson Bridge Co., Tacoma, Wash., general contractor at $756,238.

STRUCTURAL STEEL PENDING

41,000 tons, cables and suspender rope, Narrows Bridge, Triboro Bridge & Tunnel Au-

STEEL SHOT

$165.00 per ton

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thority, New York, U. S. Steel Corp., Pittsburgh, low bidder at $56,896,390; John A. Roebling Sons Div., Trenton, N. J. (Colorado Fuel & Iron Corp.) was second low at $59,656,572; Bethlehem Steel Co., Bethlehem, Pa., was third low at $61,712,594. Bids went in Feb. 24 on 53,000 tons for towers; bids on 66,000 tons for the suspended structure will not come up for figuring for some time. Tower foundations, on which J. Rich Steers Inc. and Frederick Snare Corp. are joint contractors, will require an additional 13,000 tons, mostly reinforcing steel .

4500 tons, municipal auditorium, Prudential Center; bids Mar. 16, Municipal Auditorium Commission, Boston; readvertised.

1025 tons, state highway bridge, Waterbury-Bolton, Vt.; also 225 tons, concrete reinforcing bars, and 200 tons of steel piles; bids Apr. 22, at Montpelier, Vt.; Contract 1.

705 tons, state highway structures, Waterbury-Bolton, Vt.; also 210 tons of concrete reinforcing bars, and 100 tons of steel piles; bids Apr. 29 to Montpelier, Vt., Contract 3.

625 tons, Pennsylvania State bridgework, Bucks County, representing the first contract on the Delaware Expressway, Booth & Flynn, Pittsburgh, low on the general contract; another section of this job which would have required an additional 1400 tons of structurals, will go prestressed concrete.

295 tons, two 3-span composite wide flange beam bridges, Interstate Route 89, Waterbury-Bolton, Vt.; also 205 tons, concrete reinforcing bars, and 100 tons of steel piles; Contract 2, bids to Montpelier, Vt.

289 tons, state bridgework, Middlesex County, New Jersey; bids Mar. 10; also required are about 100 tons of reinforcing steel.

Unstated, 1126 ft Montana State railroad overpass, Cascade County; Robertson & Cave and Sletten Construction Co., Great Falls, Mont., joint low bidders at $1,138,688.

Unstated, 60 ton, electric, overhead track crane for Cougar Dam powerhouse, Oregon; bids to U. S. Engineer, Portland, Oreg., f.o.b. Springfield, Oreg.

Steel Product Shipments by Markets—December, 1959

(Net tons, all grades)

	December		Total 12 Months	
Market Classifications	1959	1958	1959	1958
Converting, processing	432,983	254,469	3,118,537	2,854,574
Forgings (except auto)	125,119	88,818	955,707	767,217
Fasteners	146,332	99,504	1,086,889	878,873
WAREHOUSES:				
Oil and gas	173,468	112,864	1,880,219	1,004,510
All other	1,422,463	902,915	11,159,336	9,897,773
Total warehouse	1,595,931	1,015,779	13,039,555	10,902,283
CONSTRUCTION:				
Rail transportation	3,277	1,997	39,715	43,155
Oil & gas	213,612	109,773	2,259,745	2,099,785
All other	781,489	569,924	6,216,892	6,579,609
*Total construction	998,378	681,694	8,516,352	8,722,549
Contractors' Products	424,614	299,263	3,574,802	3,467,189
AUTOMOTIVE:				
Cars, trucks, parts	1,748,099	1,298,028	13,781,870	9,850,140
Forgings	47,630	30,901	425,056	274,894
Total automotive	1,795,729	1,328,929	14,206,926	10,125,034
RAIL TRANSPORTATION:				
Rails, track, equip.	70,283	52,348	763,309	584,664
Cars & locomotives	202,108	91,131	1,571,875	866,780
Transit system	2,840	2,160	21,663	20,668
Total railroad	275,231	145,639	2,356,847	1,472,112
Shipbuilding	74,496	65,578	645,805	797,511
Aircraft	10,468	6,725	71,572	62,209
Oil & gas drilling	60,906	31,433	540,382	305,923
Mining, quarrying, etc.	34,828	16,095	234,684	179,505
AGRICULTURAL:				
Machinery	113,755	82,082	965,516	902,591
All other	31,392	19,985	300,564	290,523
Total agricultural	145,147	102,067	1,266,080	1,193,114
Machinery, tools, etc.	482,590	342,712	4,158,903	3,181,196
Elec. machinery, equip.	248,469	180,051	2,051,383	1,771,514
Appliances, etc.	203,994	180,261	1,829,531	1,590,095
Other domestic equip.	218,309	155,070	1,840,091	1,715,542
CONTAINERS:				
Cans & closures	464,526	123,555	5,010,558	5,252,071
Barrels, drums, etc.	97,267	72,492	772,571	800,326
All other containers	71,077	50,149	534,679	516,186
Total Containers	632,870	246,196	6,317,808	6,568,583
Ordnance, military	16,642	18,971	127,427	238,690
Nonclassified	169,543	60,430	2,029,167	691,571
Total domestic shipments	8,092,588	5,319,684	67,968,448	57,485,284
Exports	118,459	192,685	1,408,619	2,429,149
Total shipments	8,211,047	5,512,369	69,377,067	59,914,433

*Including maintenance.
Data from the American Iron & Steel Institute.

REINFORCING BARS . . .

REINFORCING BARS PLACED

435 tons, Cowlitz River bridge, Washington, State, to Mercer Steel Co., Portland, Oreg.; Anderson Bridge Co., Tacoma, Wash., general contractor.

106 tons, Lolo Pass highway bridge, Idaho, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

REINFORCING BARS PENDING

450 tons, Montana State highway projects, low bids: Silver Bow County, four highway passes, Cahill-Mooney, Butte, Mont., $334,588; McCone County, 205 ft beam bridge, C. B. Lauch Construction Co., $74,179; Fergus County, 2 ft span, Walter Mackin & Sons, Billings, Mont., $53,846.

120 tons or more, addition to Camlin Hotel, Seattle; Baugh Construction Co., Seattle, general contractor.

Unstated, second unit, College of Business Administration, University of Washington; bids Mar. 10; Decker & Christensen, Seattle, architect.

Unstated, technology building addition, Washington State University, Pullman; Purvis Construction Co., Yardley, Wash., is low at $802,825.

Unstated, Oregon State highway projects, bids to Salem, Oreg., Mar. 1: Jackson County, six concrete spans; Lane County, 586 ft traffic ramp at Eugene; Multnomah County, Corbett St. interchange and connections for Banfield Freeway.

PLATES . . .

PLATES PENDING

100 tons or more, steel water reservoir; bids to Montlake Terrace, Wash., Mar. 7.

PIPE . . .

CAST IRON PIPE PLACED

Unstated, 1000 ft of 12 in. for river crossing, South Bend, Wash., to American Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

Unstated, 14,670 ft of 4 to 12 in.; bids to Board of Regents, Pullman, Wash., Mar. 1.

DISTRICT INGOT RATES

(Percentage of capacity engaged)

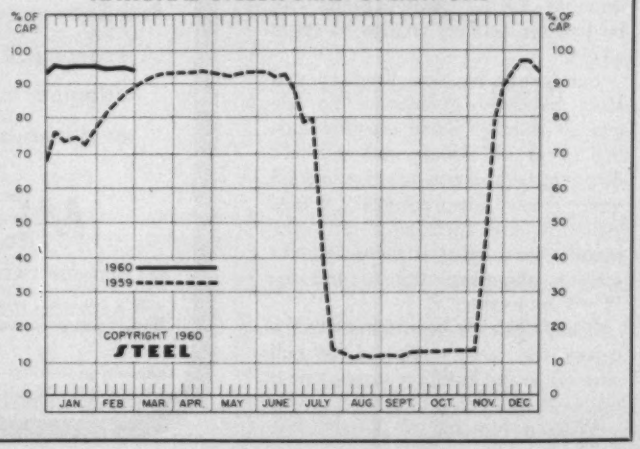
	Week Ended Feb. 28	Change	Same Week 1959	Same Week 1958
Pittsburgh	95.5	+ 1.5*	89	58.5
Chicago	96.5	0*	91	60
Eastern	96	0	86	67
Youngstown	95	0	88	55
Wheeling	94.5	— 0.5	91	59
Cleveland	100	— 2*	91	35
Buffalo	105	0	102.5	39
Birmingham	83.5	— 8	79	51.5
Cincinnati	99.5	+ 2.5*	94.5	51.5
St. Louis	100.5	+ 5*	94	82.5
Detroit	100.5	+ 2*	95	49.5
Western	94	0	94	68
National Rate	94	+ 0.2*	88.5	54.6

INGOT PRODUCTION

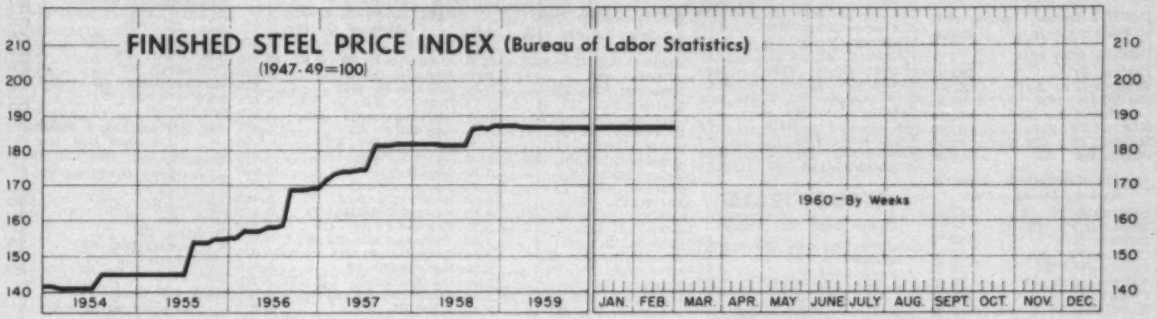
	Week Ended Feb. 28	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	166.7†	166.5	169.1	156.0
NET TONS (In thousands)	2,678†	2,674†	2,717	2,506

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,849,306 in 1960; 2,831,331 in 1959; 2,699,173 in 1958.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Feb. 23, 1960	Week Ago	Month Ago	Feb. Index	Year Ago
186.8	186.8	186.8	186.8	186.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.580	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.766
		Woven Wire Fence (20-rod roll)	21.880

STEEL's FINISHED PRICE INDEX*

	Feb. 24 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.82
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	36.17	39.67	42.33	42.83	37.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 24 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, 7/32-9/16" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Feb. 24 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$36.50	$40.50	$42.50	$44.50	$38.50
No. 1 Heavy Melt, E. Pa.	38.00	40.00	42.00	40.00	39.50
No. 1 Heavy Melt, Chicago	34.00	38.50	42.50	44.00	34.00
No. 1 Heavy Melt, Valley	39.50	43.50	47.50	48.50	37.50
No. 1 Heavy Melt, Cleve.	36.50	40.50	43.50	44.50	34.00
No. 1 Heavy Melt, Buffalo	36.50	36.50	37.50	41.50	32.50
Rails, Rerolling, Chicago	59.50	61.50	63.50	63.50	49.50
No. 1 Cast, Chicago	47.50	50.50	55.50	49.50	40.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

Steel Prices

Mill prices as reported to STEEL, Feb. 24, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 121; footnotes, page 125.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)

Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ...119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP

Aliquippa,Pa. J5 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N. J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago, Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 ....7.50

FLOOR PLATES

Cleveland J5 ....6.375
Conshohocken,Pa. A3..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 .6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O(23) R2 ....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa. (23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle A24, B3, N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 .5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy

Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2 W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5 .5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron

Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2.9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N. J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford, Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025

Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 ....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda (3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ...5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.35
Cleveland R2 .....5.875
Warren, O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ...6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 ..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 ..6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt., Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ...7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Wall Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) .9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H.K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Aliquippa,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackawanna,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
San Francisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2 S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, S5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapo'is S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	0.80C	1.05C	1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped 1.25 Common Coke	lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65
					Stator
Vandergrift,Pa. U5					8.10
Mansfield,O. E6					8.10
Warren,O. R2 (Silicon Lowcore)					8.10

SHEETS (22 Ga., coils & cut lengths)
Fully Processed

(Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	18.10	19.70	20.20	20.70	15.70††	
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity, Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie, Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

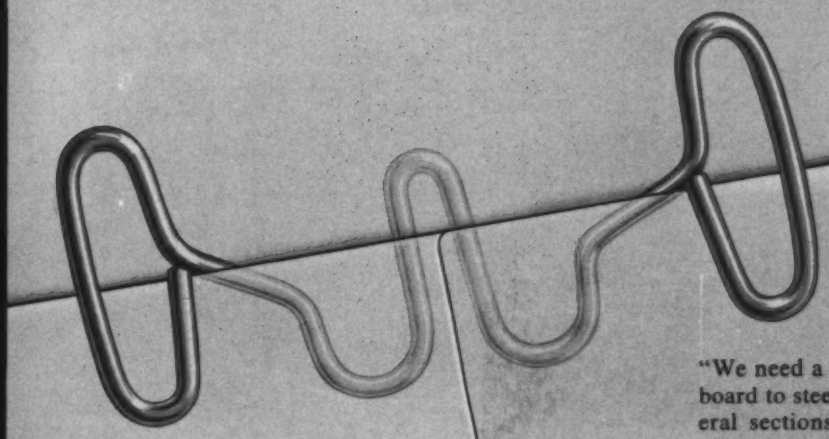
ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

KEYSTONE WIRE... DUDEK & BOCK

turn an idea into a reality



"We need a clip that will securely fasten gypsum board to steel upright studs—or join and hold several sections of board in perfect alignment for plastering. Here's what it must look like."

This is the challenge. Designers at Dudek & Bock, Chicago, Illinois, roll up their shirt sleeves. They analyze wire requirements: tensile, uniformity. Length of run—a long one. Delivery—soon.

What wire fits these requirements? Keystone Silver Brite Galvanized high tensile wire is first choice. They know from experience they can depend on Keystone wire to perform exactly as calculated—order after order—run after run. By standardizing on Keystone wire for the majority of their needs, Dudek & Bock simplify quality control and manufacturing problems. They regularly use a wide selection of Keystone wire to meet their forming and spring requirements—this includes low and high carbon wire, brite and galvanized.

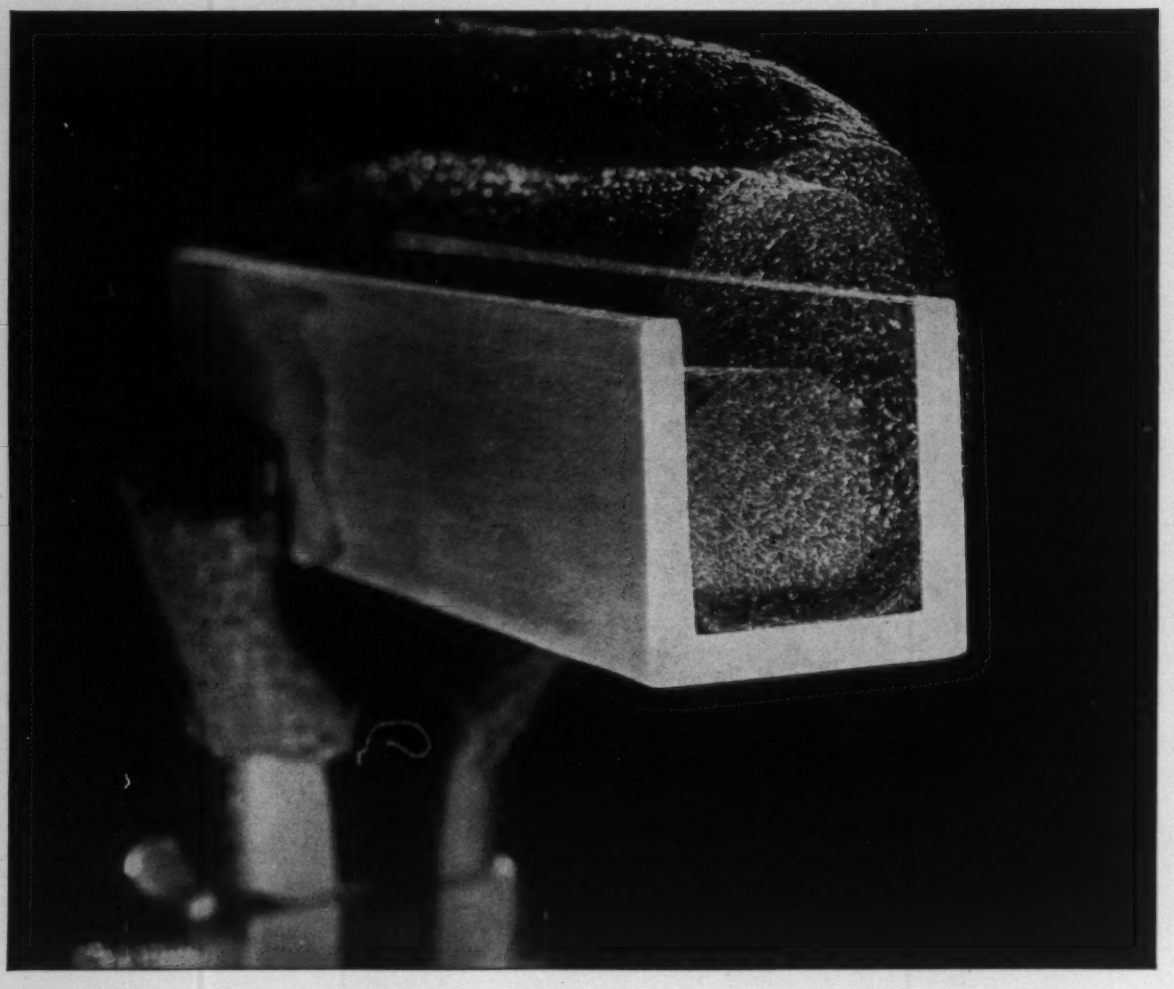
Result: Another fastener problem solved with wire . . . delivery on schedule of this gypsum board clip and thousands of other items . . . and maximum customer satisfaction.

Perhaps creative imagination and Keystone wire can help you build your products faster, better, at lower cost. A Keystone cold heading or wire forming specialist is available to help you.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY



Seal even irregular gaps and seams with

3M HEAT EXPANDABLE SEALERS

TIGHTER, TIGHTER, TIGHTER grow seals of unique 3M Heat Expandable Sealers. Expanding up to 125% under the normal heat of a paint-baking cycle, they cure to a tough, flexible mass that *really* keeps out dirt, water and weather . . . that *completely* seals even the most irregular gap or seam.

In either *liquid* or *extruded bead* form, 3M Heat Expandable Sealers help you save time and cut costs, too. Simply flow in the liquid or lay in the extruded solid by hand. There's no material waste, no cleanup time involved. And because no solvent is present, there's no danger of toxicity or fire.

The unexpanded solid is also efficient as a gasket replacement sealer, flange sealer and for other sealing jobs. It's tacky enough to stay in a vertical or overhead seam. Yet, it can be easily removed. Proper positioning is never a problem. Investigate versatile 3M Heat Expandable Sealers now.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

Contact your 3M Field Engineer. Or, for more information, write on your company letterhead, stating your area of interest, to: A.C.&S. Division, 3M, Dept. SBEE-20, St. Paul 6, Minn.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	175
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	175
Kokomo,Ind. C16	175
Minnequa,Colo. C10	175
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7 ... $10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10 .. $10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	9.24
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	9.94
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	9.94
SparrowsPt.Md. B2	9.34
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	9.54
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	10.26
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.64
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	9.59
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	10.37
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.69
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F3	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193*
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv.	Stone Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran.C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775§
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48) N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, standard stock sizes:

Plain Finish	50
Hot Galvanized and zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16
Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38
Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam, 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St. Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Too Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2 ... 15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp., American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: Carbon Base 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base—Cold Rolled—10%	Strip, Carbon Base—Cold Rolled—Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	66.00	66.50	66.50	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90% Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[a]	10.06	....	11.45[c]	10.05[d]	11.80#	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14#	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.77	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.80[a]	9.95[a]	11.15	55.98	10.65[c]	9.00[d]	11.45#	15.40	9.25	9.00[e]	10.85[f]
Chattanooga	8.35	9.89	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.73[a]	9.88[b]	11.14	52.33	10.51[c]	8.96[d]	11.25#	15.16	9.75	8.92[e]	10.56[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	10.13[a]	10.60[b]	12.19	52.00	11.28[c]	9.42[d]	13.10#	16.55	9.34	9.47[e]	11.31[f]
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.63
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.35	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.89	52.17	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.73[a]	9.88[b]	11.03	52.33	10.49[c]	8.85[d]	11.25#	15.05	9.00	8.68[e]	10.32[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.64[a]	9.83	11.28	....	10.30[c]	8.75[d]	9.78	15.43	9.25	8.60[e]	10.37[f]
St. Paul	9.00[a]	9.59[b]	10.74	....	10.66[c]	9.12[d]	11.49#	16.54	9.63	8.95[e]	10.49
San Francisco	9.65	11.10	11.55	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane, Wash.	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.
[a]10 Ga.; [b]20 Ga.; [c]⅛ x 1 in.; [d]¾-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.
Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [5]—1000 to 4999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $30-$33, contract; Mexican, all rail, duty paid $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$19.00-19.50*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 48-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.00†
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	36.00-37.00†
Domestic	
Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry Coke	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$32.00

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron.	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron:	
98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	*35.10-52.20†*
Bronze, 5000-lb lots	*53.10-52.70†*
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	*60.70-69.00†*
Phosphor-Copper, 5000-lb lots	*66.00*
Copper (atomized) 5000-lb lots	*46.50-64.50*
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89 00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr. min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.95	$6.00	$5.85	$5.70	$6.10
Bar Size Angles	5.95	6.00	5.85	5.75	6.10
Structural Angles	5.86	5.91	5.76	5.66	6.01
I-Beams	5.86	5.91	5.76	5.66	6.01
Channels	5.86	5.91	5.76	5.66	6.01
Plates (basic bessemer)	5.98	6.03	5.88	5.78	6.13
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in. coils) 20 Ga., 48 in. wide	9.80	9.85	9.70	9.60	9.95
Sheets, C.R. (drawing quality)	10.70	10.75	10.60	10.50	10.85
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.50	6.55	6.40	6.30	6.65
Merchant Bars	6.39	6.44	6.29	6.19	6.54
Hot-Rolled Bands	7.90	7.95	7.80	7.70	8.05
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (§)	7.95	8.00	7.85	7.75	8.10

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

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STEEL WIRE RODS

Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

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Bulletin S60 gives details.

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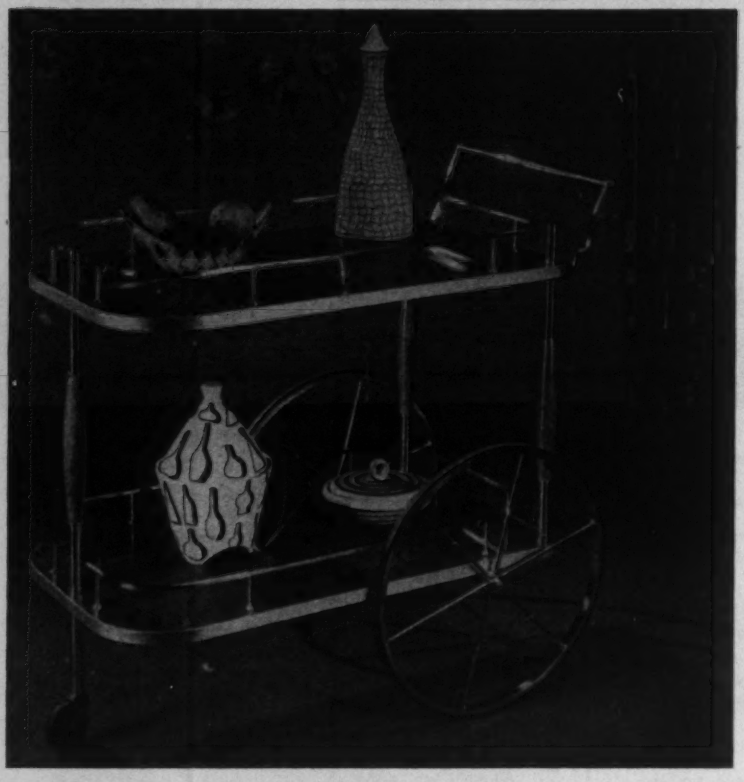

Manufacturers of a wide variety of products find Bridgeport Free Machining Brass Rod eminently suited to their items—from both a production and beauty point of view. Furniture manufacturers are but one successful example.

The production steps involved in manufacturing such furniture are frequently numerous and complex. For example, a solid brass tea cart such as shown here may represent some ten or more separate production steps. These include cutting, bending, drilling, tapping, twisting, polishing and lacquering, most of which are done on high-speed automatic equipment. The objective here, as with any screw machine operation, is high *uninterrupted* speeds. An increasing number of manufacturers are achieving these uninterrupted speeds with Bridgeport rod and tubing of various shapes and sizes. They find, on a comparative basis, that the high quality of Bridgeport Free Machining Brass is *constant* and can be depended on from end to end.

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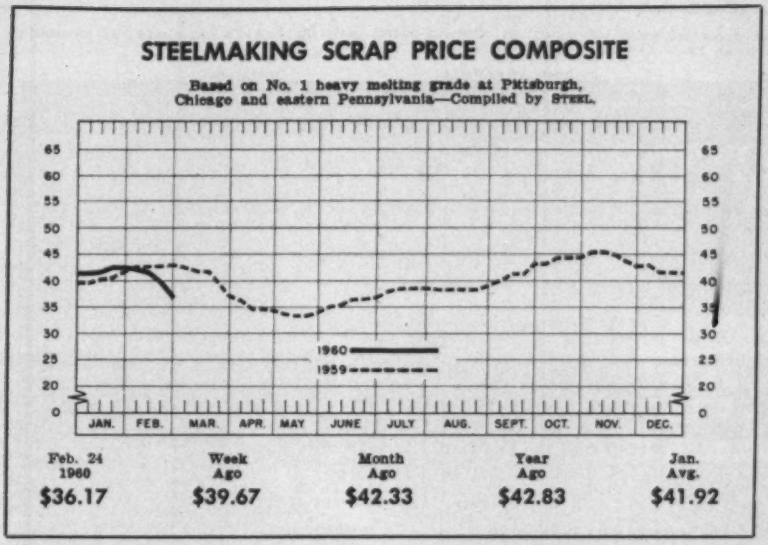

Scrap Price Sinks as Buying Lags

STEEL's composite on No. 1 heavy melting grade dives $3.50 a ton to $36.17, lowest since June, 1959. Demand extremely slow in domestic and export markets

Scrap Prices, Page 132

● **Chicago**—Sharply sagging prices are failing to attract purchasers. Quotations on the steelmaking grades are considered nominal as important mills remain out of the market. The decline ranges from $1 to $4 a ton. Dealer material is particularly weak. Uncertainty over steelmaking activity in the second quarter and later appears to be the chief unsettling factor. Mills hold good inventories, and there is a steady flow of industrial scrap. Steelmakers are leaning heavily on blast furnace hot metal to support high level ingot production.

● **Pittsburgh**—Lack of demand and talk of lower steelmaking operations in the second quarter are depressing the market. Quotations on important grades are the lowest they have been since last June. The district's largest consumer bought No. 2 bundles at $27 a ton, $5 less than it paid in January. A smaller mill reportedly paid only $36 a ton for No. 1 heavy melting scrap and $39 to $40 for No. 1 dealer bundles. Brokers' bids on industrial bundles are expected to be far below last month's figures.

● **Philadelphia**—With demand lagging, scrap prices have declined. The major steel grades are off $2 to $3 a ton. No. 1 heavy melting is quoted $38, delivered; No. 2 heavy melting $33; No. 1 bundles $42; No. 2 bundles $23; No. 1 busheling $42; and electric furnace bundles $43.

Limited domestic demand and a slump in export requirements are reflected in the downturn in prices. Domestic buying is on a week-to-week basis.

Spotty domestic demand is also reflected in weaker prices on the minor grades. Mixed borings and turnings are down to $22, delivered, shoveling turnings are $25-$26, and machine shop turnings $21. Heavy turnings are easier at $31-$32, low phos structural and plate $43-$45. Railroad specialties are easy but unchanged. Heavy breakable cast is off $2 to $45.

● **New York**—Export tonnage for March shipment has been largely covered. That factor, combined with relatively little domestic business, has led to a substantial decline in the prices on the major melting grades. Brokers' buying prices for No. 1 heavy melting and No. 1 bundles are now $35-$36, on No. 2 heavy melting $29-$30, and on No. 2 bundles $19-$20. Machine shop turnings are nominally easier at $8-$9, and while prices on mixed borings and shoveling turnings are unchanged, they are nominal. Cast iron and stainless steel grades are unchanged but easy.

● **Cleveland**—Scrap prices haven't reached bottom. Last week, they fell off $3 to $4 a ton, bringing No. 1 heavy melting steel to $36-$37 in Cleveland and $39-$40 in the Valley. Other steel grades are similarly lower on appraisal in the absence of a buying test. The cast iron grades are unchanged for the present, though it's expected they'll be sympathetically affected by the decline in the steel grades. Reason for the slump: Heavy supplies and uncertainty as to the trend of steelmaking operations in second quarter.

● **Buffalo** — Steel scrap is weaker, but there have been no sales on which to base prices. Dealers generally feel the market is down about

(*Please turn to Page* 137)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Feb. 24, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 24	$36.17
Feb. 17	39.67
Jan. Avg.	41.92
Feb. 1959	42.58
Feb. 1955	36.79

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 dealer bundles	*39.00-40.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*36.00-37.00*
No. 1 factory bundles	*44.00-45.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*21.00-22.00*
Short turnings	*28.00-29.00*
Cast iron borings	*28.00-29.00*
Cut structurals:	
2 ft and under	*47.00-48.00*
3 ft and under	*46.00-47.00*
Heavy turnings	35.00-36.00
Punchings & plate scrap	*50.00-51.00*
Electric furnace bundles	*45.00-46.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Random rails	*55.00-56.00*
Angles, splice bars	*50.00-51.00*
Railroad specialties	*52.00-53.00*
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*35.00-36.00*
No. 1 hvy melt., dealer	*32.00-33.00*
No. 2 hvy melting	*29.00-30.00*
No. 1 factory bundles	*37.00-38.00*
No. 1 dealer bundles	*33.00-34.00*
No. 2 bundles	*19.00-20.00*
No. 1 busheling, indus.	*35.00-36.00*
No. 1 busheling, dealer	*32.00-33.00*
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	*20.00-21.00*
Shovel turnings	*20.00-21.00*
Cast iron borings	*20.00-21.00*
Cut structurals, 3 ft	*44.00-45.00*
Punchings & plate scrap	*46.00-47.00*

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Stove plate	*45.00-46.00*
Unstripped motor blocks	*41.00-42.00*
Clean auto cast	*55.00-56.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
R.R. malleable	*57.00-58.00*
Rails, 2 ft and under	*55.00-56.00*
Rails, 18 in. and under	*56.00-57.00*
Angles, splice bars	*50.00-51.00*
Axles	*54.00-55.00*
Rails, rerolling	*59.00-60.00*

Stainless Steel Scrap

18-8 bundles, solids	220.00-225.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*18.00-19.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*16.00-17.00*
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*11.00-12.00*
Mixed borings, turnings	*10.00-11.00*
Shovel turnings	*9.00-10.00*

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Stove plate	*36.00-37.00*
Heavy breakable	*36.00-37.00*
Unstripped motor blocks	*28.00-29.00*
Charging box cast	*36.00-37.00*
Clean auto cast	*49.00-50.00*

CLEVELAND

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 factory bundles	44.00-45.00
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*36.00-37.00*
Machine shop turnings	13.00-14.00
Shovel turnings	18.00-19.00
Mixed borings, turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut foundry steel	*38.00-39.00*
Cut structurals, plate 2 ft and under	*46.00-47.00*
Low phos. punchings & plate	*39.00-40.00*
Alloy free, short shovel turnings	20.00-21.00
Electric furnace bundles	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	39.00-40.00
Heavy breakable cast	39.00-40.00
Stove plate	47.00-48.00
Unstripped motor blocks	37.00-38.00
Brake shoes	39.00-40.00
Clean auto cast	56.00-57.00
Burnt cast	47.00-48.00
Drop broken machinery	54.00-55.00

Railroad Scrap

R.R. malleable	*58.00-59.00*
Rails, 2 ft and under	*57.00-58.00*
Rails, 18 in. and under	*59.00-60.00*
Rails, random lengths	*53.00-54.00*
Cast steel	*49.00-50.00*
No. 1 railroad cast	*54.00-55.00*
Railroad specialties	54.00-55.00
Angles, splice bars	54.00-55.00
Rails, rerolling	*69.00-70.00*

Stainless Steel (Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-120.00
430 turnings	45.00-55.00

YOUNGSTOWN

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 busheling	*39.00-40.00*
No. 1 bundles	*40.00-41.00*
No. 2 bundles	*25.00-26.00*
Machine shop turnings	16.00-17.00
Shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Low phos.	*42.00-43.00*
Electric furnace bundles	*42.00-43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00

BUFFALO

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	36.00-37.00
No. 2 bundles	27.00-28.00
No. 1 busheling	36.00-37.00
Shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos. structurals and plate, 2 ft and under	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	49.00-50.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	45.00-46.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*36.00-37.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*19.00-20.00*
Shovel turnings	22.00-23.00
Cast iron borings	21.00-22.00
Low phos. 18 in.	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Heavy breakable cast	*39.00-40.00*
Charging box cast	*40.00-41.00*
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	51.00-52.00

PHILADELPHIA

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*33.00*
No. 1 bundles	*42.00*
No. 2 bundles	*23.00*
No. 1 busheling	*42.00*
Electric furnace bundles	*43.00*
Mixed borings, turnings	*22.00†*
Shovel turnings	*25.00-26.00†*
Machine shop turnings	*21.00*
Heavy turnings	*31.00-32.00*
Structurals & plates	*43.00-45.00*
Couplers, springs, wheels	49.00
Rail crops, 2 ft & under	66.00-67.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	*45.00*
Drop broken machinery	53.00
Malleable	66.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*19.00-20.00*
Machine shop turnings	*8.00-9.00†*
Mixed borings, turnings	12.00-13.00†
Shovel turnings	13.00-14.00†
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	90.00-95.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	35.00-36.00
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
No. 1 cast	39.00-40.00
Mixed cupola cast	36.00-36.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	41.00-42.00
Cast iron borings	14.00-15.00
Machine shop turnings	*23.00-24.00*
Shovel turnings	*24.00-25.00*
Bar crops and plate	44.00-45.00
Structurals & plate	*43.00-44.00*
Electric furnace bundles	41.00-42.00
Electric furnace:	
3 ft and under	38.00-39.00
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
Rails, 18 in. and under	56.00-57.00
Rails, rerolling	*58.00-59.00**
Rails, random lengths	*51.00-52.00*
Angles, splice bars	49.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*35.00*
No. 2 heavy melting	*33.00*
No. 1 bundles	*41.00*
No. 2 bundles	*24.00*
No. 1 busheling	*41.00*
Machine shop turnings	*17.00*
Shovel turnings	*19.00*

Cast Iron Grades

No. 1 cupola	*48.00*
Charging box cast	45.00†
Heavy breakable cast	43.00†
Unstripped motor blocks	40.00†
Clean auto cast	*50.00*
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00
Rails, 18 in. and under	*50.00*
Rails, random lengths	*46.00*
Rails, rerolling	61.00†
Angles, splice bars	*46.00*

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	*37.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*37.00*
No. 2 bundles	*22.00*
Machine shop turnings	*15.50-16.00*
Shovel turnings	*20.00*
Low phos. plate & structurals	*43.00-44.00†*

Cast Iron Grades

No. 1 cupola	*42.00-43.00†*
Heavy breakable	*29.00†*
Foundry malleable	*39.00-40.00†*
Unstripped motor blocks	35.50-36.50†

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00†*

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	38.00
No. 2 heavy melting	35.00
No. 1 bundles	34.00
No. 2 bundles	21.00
Machine shop turnings	19.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	37.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	23.00
Shovel turnings	22.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	35.00
Unstripped motor blocks	31.00
Stove plate	25.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	20.00-22.00
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	45.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	30.00
Unstripped motor blocks	25.00
Stove plate (f.o.b. plant)	21.00†

SAN FRANCISCO

No. 1 heavy melting	38.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	13.00
Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

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*Brokers' buying price.
†Nominal.
‡F.o.b. Hamilton, Ont.

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Market Is Taking Breather

The general nonferrous picture: Sales were good earlier in the year; they're not bad now; and they should pick up again in March. Prices look unusually stable

Nonferrous Metal Prices, Pages 136 & 137

"IT'S QUIET but not gloomy."

That is how one metalman sums up the current nonferrous market. His comment is pretty typical. Nonferrous executives admit that sales in all cases might not be up to expectations, but there's nothing wrong with them.

Says a metal vice president: "All the gloom and doom that's beginning to pop out can be laid at the feet of overoptimistic people who expected too much to begin with. Sure, we know some of the fabricators are disappointed in sales to date, but we still think 1960 is going to be a good year, and by good I mean significantly above 1959."

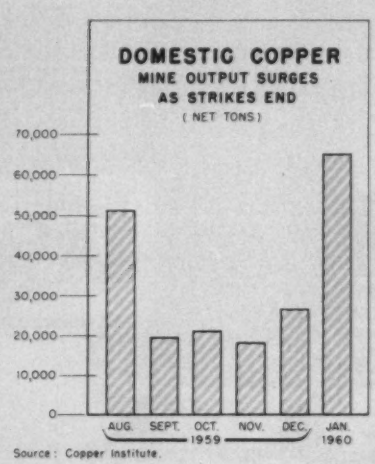
A quick glance at the metal market backstops his views.

• **Zinc**—Heavy buying marked the early part of the year. Sales have slumped a little since—currently, they could be termed moderate. There are signs that things are beginning to perk up, and some observers look for a big upswing in new orders in March. The price should hold at 13 cents a pound.

• **Lead**—The metal is a little weaker than zinc but is more subject to the "feast and famine" routine than its sister metal. Since the heavy buying wave at the close of 1959 and a lesser one in the early days of the new year, things have been quiet. Expectations: Business should pick up in March. Consensus is the price won't fall below the present 12 cents a pound at this time.

• **Copper**—March orders are good. It's too early to tell about April. Copper fabricators, who complained of disappointing sales in January, saw some improvement this month and hope that March will be even better. There's no shortage of copper, but there is a lack of certain shapes, such as wire bars, cakes, and billets—at least at prices customers are willing to pay.

The primary price should hold at 33 cents a pound—the custom smelter quotation could dip within the next few weeks.



Source: Copper Institute

• **Tin**—Business has been firm over the last few weeks. Contrary to expectations, tin platers, who previously said their inventories were high, have been buying heavily. Demand may drop a little over the next few weeks but will still be good, say sellers. Predictions are prices won't drop much from present levels.

• **Nickel**—"While there's no slump in sales, we get the feeling some of our customers are a little uneasy about business conditions." says a nickel executive. "Personally, while we admit the future's hazy, we believe any letdown would be small." The Cuban nickel situation remains unresolved. American interests still don't know what kind or how much tax they'll eventually have to pay. In the years ahead, nickel sales will be anything but static, believes Horace J. Fraser, president of Falconbridge Nickel Mines Ltd., Toronto, Ont. He sees Free World consumption increasing at an average rate of 25 million lb a year as steel output and capacity rise.

Market Memos

• **Busy Potlines**—Primary aluminum producers turned out 164,027 tons of metal in January, up 10,000 tons from January, 1959, and the best month since last October, reports the Aluminum Association.

• **More Columbium**—What may be the world's largest and richest deposit of columbium ore has been found practically at our doorstep. K. C. Li, president of Wah Chang Corp., New York, says a deposit uncovered in Brazil may hold up to 15 billion lb of contained columbium metal—enough to satisfy demand for many years.

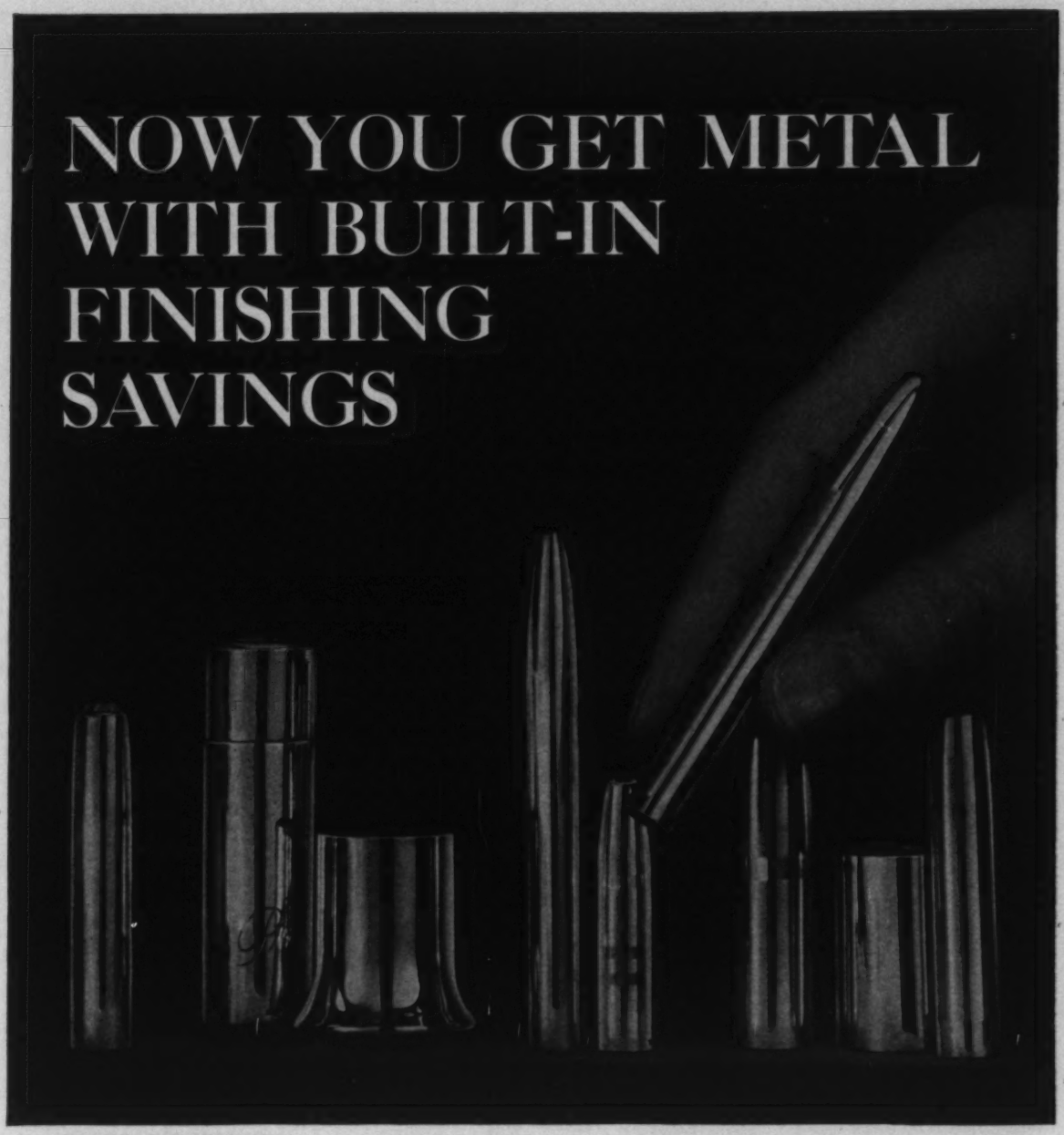
• **Siding Soars**—Between 1950 and 1959 the use of aluminum residential siding leaped from 9500 tons to 55,300 tons, an increase of 482 per cent, says the Aluminum Co. of America. And the company estimates the market will jump to 90,000 tons by 1963.

NONFERROUS PRICE RECORD

	Feb. 24 Price	Last Change	Previous Price	Jan. Avg	Dec. Avg	Feb., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	25.300	24.700
Copper	33.00–35.00	Dec. 23, 1959	33.00	34.000	33.289	30.159
Lead	11.80	Dec. 21, 1959	12.30	11.800	12.338	11.368
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	101.125	Feb. 24, 1960	101.50	99.875	99.130	102.364
Zinc	13.00	Jan. 8, 1960	12.50	12.917	12.500	11.409

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

NOW YOU GET METAL WITH BUILT-IN FINISHING SAVINGS



Faster production and up to 40% cut in polishing costs are made possible by superfine-grain structure of Formbrite® Drawing Brass

The jeweler's finish which Accurate Forming Corp., Franklin, N. J., gives pen caps and barrels previously meant the use of five polishing heads and a time bottleneck in production—resulting in a high polishing "cost factor." After switching to Red Brass-Formbrite, they use two polishing heads for a light cut and another for a simple color buff and run the machines faster. Savings run up to 40%. The secret of Formbrite is its superfine grain, produced by special rolling and annealing techniques. Formbrite is springier, harder, more scratch-resistant than the usual drawing brasses in the same standard tempers, yet retains remarkable ductility for forming and drawing. Despite its superiority, *Formbrite costs no more than ordinary drawing brass.* Get full details from your Anaconda representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 6960

FORMBRITE

SUPERFINE-GRAIN DRAWING BRASS AN

ANACONDA®

product made by The American Brass Company

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 30.70; No. 214, 31.50; No. 356, 28.60, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb, 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 35.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $213-215 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 101.125.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.25; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 26.25; 13 alloy, 0.60 Cu max., 26.25; 195 alloy, 28.00-28.75; 108 alloy, 25.50-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.00
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths.

Diam.	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft. lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft. lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-68.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plate: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.00-25.50; No. 2 heavy copper and wire, 21.50-22.00; light copper, 20.00-20.50; No. 1 composition red brass, 18.00-18.50; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 16.50-17.00; new brass clippings, 14.50-15.00; light brass, 11.00-11.25; heavy yellow brass, 12.00-12.50; new brass rod ends, 12.00-12.25; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 14.00-14.25; brass pipe, 14.00-14.25.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 7.25-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippings, 28.00-29.00; old sheets, 24.00-26.00; turnings, 20.00-22.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 54.00-56.00; turnings, 43.00-45.00; rod ends, 54.00-56.00.

Zinc: Old zinc, 4.50-5.00; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.50-13.00; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.50-17.00; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.50-16.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 12.00-12.25; clean borings and turnings, 11.00-11.50; segregated low copper clips, 16.00-16.50; segregated high copper clips, 15.00-15.50; mixed low copper clips, 15.50-16.00; mixed high copper clips, 14.50-15.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivery refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.25-25.75; light copper, 23.00-23.50; refinery brass (60% copper) dry copper content, 24.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.25-25.75; light copper, 23.00-23.50; No. 1 composition borings, 21.75-22.00; No. 1 composition solids, 22.25-22.50; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 17.00-17.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50; 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 131*)

$2 a ton, and that new purchases will probably see No. 1 heavy melting quoted $34-$35. The cast iron grades are holding, but it's reported the market is under pressure and next sales to foundries may be at lower prices. All classes of mill scrap are in plentiful supply.

• **Cincinnati**—Prices fell $1 a ton last week, No. 1 heavy melting sinking to a range of $35-$36. Consumers are not buying, and uncertainty about steel mill operations is causing concern. Except for some distress selling by dealers, the market is inactive.

• **St. Louis**—Scrap prices have taken a battering, dropping $1 to $5 a ton down the grade list. Excess tonnage and reluctance of the mills to buy substantial volume have broken the market wide open. The mills won't even quote prices, and, frequently, they turn down offerings, or take only small amounts.

• **Birmingham**—Brokers are surprised that consumers are not posting sharply lower prices, considering the sluggish movement of the steelmaking grades. They think quotations will be off noticeably when the large users re-enter the market. Both open hearth and electric furnace operators are out of the market, and the few scrap items moving are quoted down $1 a ton from recent levels. The export market is quiet.

• **Houston**—Steel scrap prices have declined $2 a ton on a limited March purchase by the local steel mill. Brokers' prices are $37 for No. 1 heavy melting, $34 for No. 2 heavy melting, $22 for No. 2 bundles, and $20 for turnings.

The price decline had been expected. The Texas market lacks firm demand and yard inventories are growing. Export business is off sharply and no early revival is anticipated. At New Orleans and Baton Rouge, scattered export quotations are pegged at $38 for No. 1 steel and $35 for No. 2.

Mexican buyers have not returned to the Texas market. Dumping of national railroad scrap in Mexico is one reason for their continued absence.

Foundry inventories of cast scrap are high.

• **Seattle**—Dealers are looking for

STRUCTURAL STEEL FABRICATING PLANT

For Sale or Lease

In Central California in midst of great industrial expansion. 250 Ton Monthly Capacity One Shift. $107,000 including real estate. Suitable 2 or 3 men.

Box 832, STEEL
Penton Bldg. Cleveland 13, Ohio

WANT TO BUY

Steel By-Products Discs

2" to 2½" Dia. .060 to .125
4½" Dia. .060 to .125
6½" to 10" Dia. .060 to .125
11" to 12½" Dia. .085 to .095
Hot or Cold Rolled

Keystone Lamp Mfg. Corp.
Purchasing Department
Tel. Slatington, Pa. PO 7-3821

NEED JUNIOR PARTNER

With senior management talent for established structural steel shop. $50,000 cash investment required. Opportunity to acquire senior interest. Location in expanding central California area.

Box 835, STEEL
Penton Bldg. Cleveland 13, Ohio

CLASSIFIED

Representatives Wanted

SALES REPRESENTATIVE—Long established producer of metal abrasives requires Manufacturers agent for Ontario, Canada area. Also representation for Philadelphia-New Jersey area. Prefer individuals now contacting foundries, forge, steel & heat treating plants. Address: Reply to Box 825, STEEL, Penton Bldg., Cleveland 13, Ohio. State experience and present activity. Personal interview will be arranged.

MANUFACTURERS REPRESENTATIVES wanted for southern states and states west of Illinois to sell electro-zinc coated steel in coils up to 36 in. wide and enamel coated steel in coils up to 60 in. wide. AAA-1 concern. Reply Box 836, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

STRUCTURAL DRAFTING HEAD: Structural steel fabricator desires experienced man to head medium-size drafting department. Must be able to lead and train men. Graduate engineer desirable, but not absolutely essential. This is an excellent and permanent position with an active and growing company in a growing community. Salary open. Profit sharing, hospitalization, other benefits. Fargo Foundry Company, Fargo, North Dakota.

CONSULTANT for Midwest steel and alloy plate fabricating shop. Either engineering firm or individual to serve as consultant on estimating and production standards. Please give information as to experience in medium and heavy plate fabrication and fee basis. Reply Box 834, STEEL, Penton Bldg., Cleveland 13, Ohio.

CHIEF CHEMIST

For well-rated Midwest metal firm. Minimum of five years' experience in analysis and methods on stainless and high temperature alloys. Should have knowledge of X-Ray inspection techniques. Degree is desirable but not mandatory. Age to 45. The man selected will supervise six to seven laboratory technicians. Send complete details. Reply Box 833, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR CLASSIFIED RATES
And Further information write
STEEL, Penton Bldg., Cleveland 13, O.

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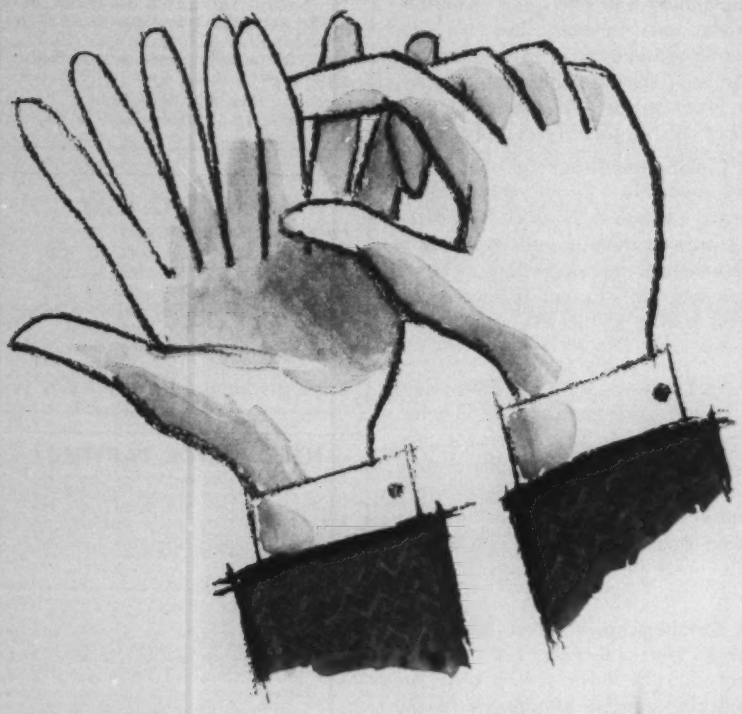

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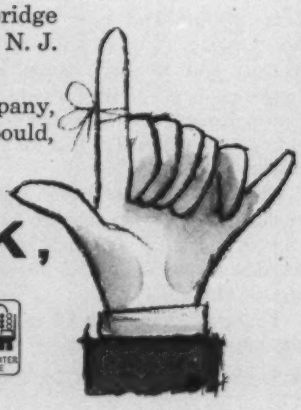

WHEELOCK, LOVEJOY & COMPANY, INC.
132 Sidney St., Cambridge 39, Mass.

betterment in the market here. However, the leading consumer in the area is buying cautiously. In the Portland (Oreg.) area, the principal buyer is temporarily out of the market and there is little activity at that point. Supplies are ample and prices are unchanged.

• **Los Angeles**—Demand continues sluggish, and no change in prices is expected before mid-March.

Scrap Stocks Largest on Record at Start of 1960

Stocks of ferrous scrap held by consumers at the end of December totaled 8,951,000 gross tons, an all-time high, reports the U. S. Bureau of Mines. Pig iron stocks totaled 2,652,000 tons, the lowest since June 30, 1957.

Domestic consumption of scrap (7,021,000 tons) and of pig iron (6,911,000 tons) in December was at a record level. The total metallics charge during the month was 13,932,000 tons.

During December, home produced scrap amounted to 3,978,000 tons, while purchased scrap totaled 3,131,000 tons.

Rails, Cars . . .

Track Material Prices, Page 125

North American Car Corp. has placed a $3,150,000 order for 250 refrigerator cars with Pacific Car & Foundry Co., Renton, Wash. The 50 ton capacity, roller bearing equipped cars will cost about $12,500 each. The first 150 cars will be 44 ft long and will be delivered this spring. The remaining 100 will be 40 ft in length, and will be delivered in the fall.

Domestic freight car orders declined in January, totaling 7149 units vs. 10,560 in December, reports the American Railway Car Institute and the Association of American Railroads. However, the total was up compared with 4007 cars placed in January, 1959.

Deliveries amounted to 2849 cars in January vs. 3032 in the preceding month, and 1940 in January, 1959.

Backlogs as of Feb. 1 showed 23,521 cars on order in railroad shops, and 24,649 in commercial shops for a total of 48,170. That compares with 43,870 on order as of Jan. 1, and 29,470 as of Feb 1, 1959.

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Work with your AIM*. . . Detroit Steel Corporation does . . .
Steel Strapping improves coil handling

DETROIT STEEL CORPORATION, HAMDEN, CONNECTICUT, sought a better way to strap coils of strip steel for shipment. Their Acme Idea Man suggested an Acme Steel Pneumatic Stretcher to secure steel coils to wood pallets. (Idea No. U6-31)

Acme Idea Man A. J. Payne serves many companies with time and money-saving ideas.

Now, with the Pneumatic Stretcher, all coils of steel are palletized with the same constant, even tension. Customers like this improved method since pallets arrive in damage-free condition because of the tighter, more secure straps. Employees like the Acme Steel Pneumatic Stretcher as it reduces fatigue and tiresome hand labor.

***Work with your Acme Idea Man.** His suggestions have saved time, money and eliminated shipping damage for many companies. Contact him at the nearest Acme Steel office. Or write, Dept.SDU-20, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois.
In Canada, Acme Steel Company of Canada, Limited, 743 Warden Avenue, Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

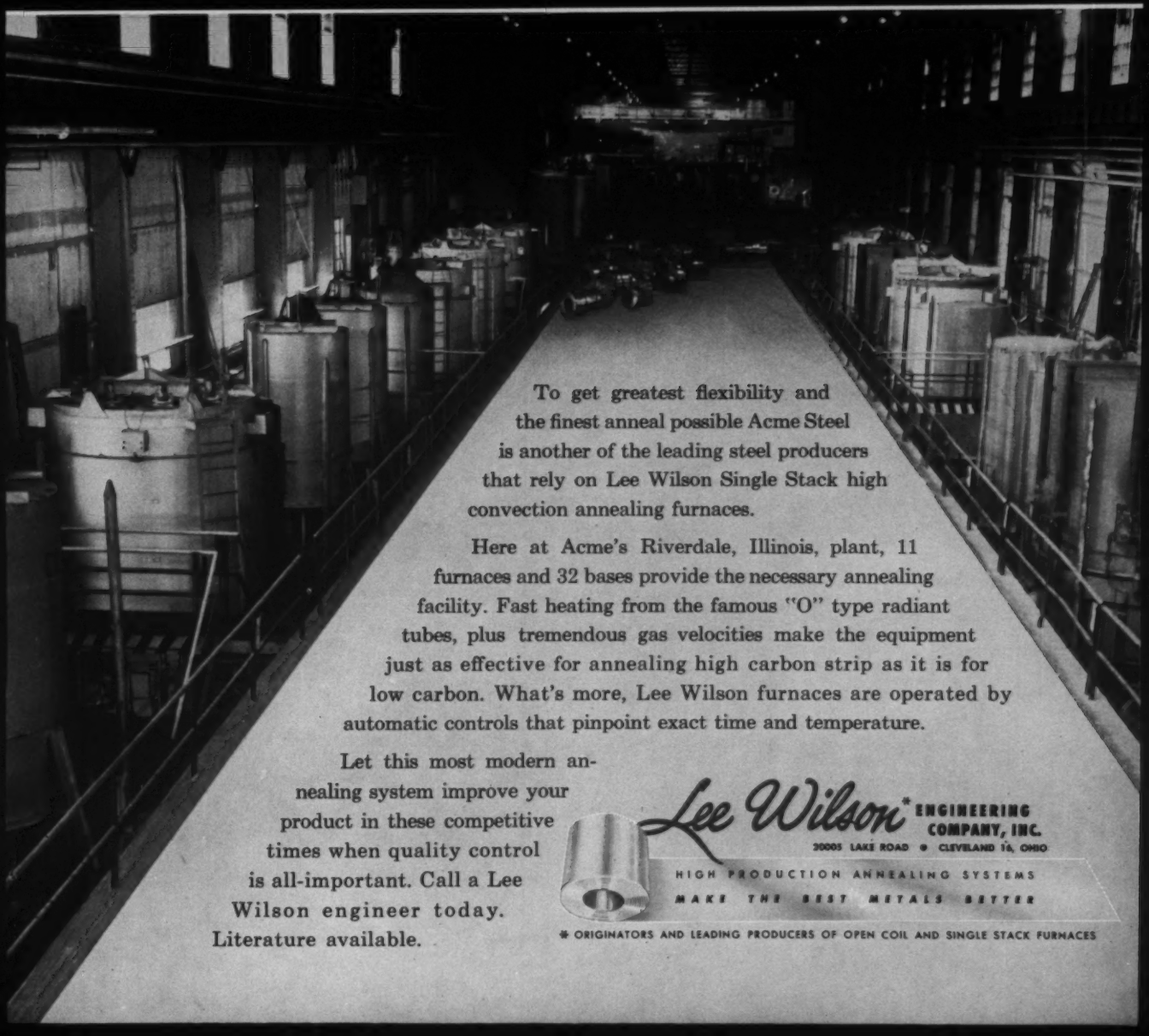
Acme Steel, too

relies on

Lee Wilson

high convection

single stack annealing furnaces



To get greatest flexibility and the finest anneal possible Acme Steel is another of the leading steel producers that rely on Lee Wilson Single Stack high convection annealing furnaces.

Here at Acme's Riverdale, Illinois, plant, 11 furnaces and 32 bases provide the necessary annealing facility. Fast heating from the famous "O" type radiant tubes, plus tremendous gas velocities make the equipment just as effective for annealing high carbon strip as it is for low carbon. What's more, Lee Wilson furnaces are operated by automatic controls that pinpoint exact time and temperature.

Let this most modern annealing system improve your product in these competitive times when quality control is all-important. Call a Lee Wilson engineer today. Literature available.

Lee Wilson* ENGINEERING COMPANY, INC.

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HIGH PRODUCTION ANNEALING SYSTEMS

MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF OPEN COIL AND SINGLE STACK FURNACES

Entry end of No. 4 continuous galvanizing line, Weirton Plant, Weirton Steel Company

Wean, Weirton and Galvanizing . . .

Weirton Steel Company, Division of National Steel Corporation, added this continuous hot-dip galvanizing line to meet the demand by customers for fine quality zinc-coated sheet. This line was specifically designed to process heavy gauge strip in widths up to 50", extending Weirton's coverage of finished sizes.

The Weirton line handles 65,000 pound coils and provides for either recoiling or shearing operations at the exit end. Shear lengths vary from 48" to 192". A horizontal cleaning section provides superior cleaning of the strip. Six bridles maintain continuous tension regulation throughout the line, permitting a wider range of gauges. Weirton's new galvanizing line is an example of Wean's *creative engineering*, oriented to solving a company's expansion needs. Why not take advantage of Wean's years of experience in your planning to meet expanding demand for galvanized products.

THE WEAN ENGINEERING COMPANY, INC. · WARREN · OHIO